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THE PRESIDENT'S PAGE

Previous W. O. C. presidents writing in this page have pointed out the various phases of bird study that are open to advanced amateur observers and have outlined the values derived from different branches of ornithology. We might well observe that in order to continue to enjoy field observation of birds or to be in a position to contribute to ornithology, we must have birds to observe and this in turn requires good bird habitat. Would it not be wise for us to divert a little more of our energies from actual bird observing to the work of preserving from destruction our birding habitats that are basic to our continued interest in birds?

One hears much about large state and federal game refuges, and state and national parks, which are excellent conservers of certain species of wildlife. I want to call your attention more especially, however, to the small, local birding places. I am keenly conscious that around Minneapolis nearly every spring we are forced to abandon some favorite place for class field observation for a less desirable place or one much farther away.

In some localities there are conservation-minded groups already organized which sponsor preservation of small natural areas. For example, the Minnesota Academy of Science sponsored the acquisition of 500-odd acres of the Cedar Creek Forest near Minneapolis and St. Paul. The Academy later turned it over to the University of Minnesota for research use by the colleges of the state. Bird watchers, either in groups or as individuals, should search out these local groups and support their efforts to rescue at least a few of our local birding areas before they are taken over by taverns, manufacturing plants, housing projects, or intensive cultivation. We, of course, cannot stand in the way of legitimate housing or agricultural developments, but most communities can afford to restrict such growth in at least a few choice natural areas if the right local forces will sponsor the imposing of such restrictions. Most state departments of conservation now have large sums of Pittman-Robertson money and more recently assigned Dingle-Johnson funds specifically set apart for, among other purposes, habitat improvement for game and fish. Direct personal appeal to, and cooperation with, the directors of these projects can result in the preserving of many fine bits of local wilderness. Direct personal contact with park board members, highway department directing personnel and such officials often pays off well in preventing so-called "development" in already preserved natural areas.

Each community has its own special problems in conserving choice birding spots and each has its own local organizations to which appeals might most profitably be directed. Considerable ingenuity and initiative must be exercised by persons making these efforts, but I am sure that very satisfying local preservation work can be done by small groups or even individuals if the right contacts are made. And, after all, most of us derive our major enjoyment from the local birds we can observe from day to day about our homes or on Saturday or Sunday morning hikes near home.

W. J. Breckenridge

LITTLE PENGUIN

(Eudyptula minor)

Adult and young at nest cavity on Phillip Island, Victoria, Australia. Sketched from life in watercolor by Richard P. Grossenheider, November, 1943.

LITTLE PENGUIN

BY RICHARD P. GROSSENHEIDER

THE Little Penguin (*Eudyptula minor*), also known as the Blue, Fairy, or Little Blue Penguin, is 14 to 18 inches long, the smallest of its singular group. During a furlough in Australia in November, 1943, I regretted greatly that I could spend only two days and nights with these birds in the rookeries on Phillip Island, Bass Strait, Victoria. Fortunately the breeding season was in full swing. Nesting sites varied, with few more than 180 yards from shore, and all above reach of high water. Some nests were scooped out under tussocks of vegetation, some in holes under or between rocks, others in sandy areas, and one was located in Stygian darkness beneath a guest house on high ground. *Mesembrianthemum* (pictured) formed extensive mats in rocky nesting areas and was quite slippery underfoot. A few penguins nested in burrows in the sand in an area where Short-tailed Shearwaters (*Puffinus tenuirostris*) also had nest holes.

During the nesting season, from September to March, the Little Penguin occurs along the coasts from southwestern Australia to southern Queensland, and in Tasmania and New Zealand. The remainder of the year is spent in adjacent marine waters. My observations on nesting add little to the extensive information compiled by L. E. Richdale (1940. *Emu*, 40:180–217), A. J. Campbell (1901. "Nests and eggs of Australian birds," part 2: 1010–1013, privately published), and others. Available dry vegetation is used for nest lining. Two roundish eggs, measuring about 2.2×1.6 inches, are laid. The shells are slightly coarse, with some gloss, and are white with a faint touch of green when freshly laid (Campbell, *op. cit.*). The incubation period is about 39 days. Young begin coming outside the burrow at four weeks of age. The chicks pictured were probably about 28 days old, as the egg tooth is lost at that age (Richdale, *op. cit.*).

Domestic duties, from nest-building to rearing the young, are shared by both parents. When one parent is in attendance at the nest, the other is usually at sea. That is, until after the young are four weeks old, when both parents are simultaneously in the water or with the young. The birds are nocturnal on land.

During my stay, adults returned after dark from marine excursions, in groups of about 30 to 60. A compact gathering or two would be seen by flashlight to bob to the surface 100 yards out. Again submerging, they would reappear in the shallows and walk up on the landing beach beyond reach of the surf. There they shook off water and preened for about 10 minutes. Then one or more started up a main trail toward the nesting sites and the rest followed closely. The characteristic posture is not as upright as in other penguins.

Above one well-used landing spot was a rising sandy beach with large, scattered tussocks of grass. The main route up this slope was a well-worn penguin path five to seven feet wide, and eight to ten inches deep. What a strange experience it was to sit very still with my feet out in this aisle, and have these startlingly man-like creatures scrambling over my ankles and legs! The penguins paid little attention to the new obstacles.

The penguins turned off along smaller pathways which led to their respective nesting areas. They soon relieved their mates and fed offspring by regurgitation. From then till daylight their "conversation" could be heard—a weird mingling of resonant groans, inspiration and expiration noises, sharp barking sounds, and pleasant piping notes.

University of Michigan Museum of Zoology, Ann Arbor, April 10, 1952

NOTES ON THE LIFE HISTORY OF *AMAZILIA FIMBRIATA* IN SURINAM

BY FR. HAVERSCHMIDT

Lesson's Emerald is a medium-sized hummingbird with a rounded tail. Above it is bronze-green, darker on the head and tail, brighter and more glittering on the under surface. The bill is almost straight. Three males that I collected in Surinam weighed 4.5, 4.8, and 5.8 grams; two females weighed 4.9 and 5.8 grams. The sexes are indistinguishable in the field.

The species occurs from northern Venezuela to southeastern Brazil. Peters (1945:64–65) recognizes eight races. The subspecies here reported on, *A. f. fimbriata*, occurs in eastern Venezuela and the three Guianas (Zimmer, 1950). In coastal Surinam, Lesson's Emerald is the commonest hummingbird, even in the gardens in the town of Paramaribo.

The Breeding Season

The main breeding season seems to be in July and August, at the end of the long rainy season and the beginning of the long dry season.

On July 21, 1951, in my garden in Paramaribo, two birds were constructing nests on horizontal branches. Nest A was two meters above the ground in a *Lagerstroemia*; nest B was five meters from the ground in a tree. Nest A was deserted a few days later but a new nest (by the same female?) was under construction on August 4, only a few centimeters from the deserted nest and on the same branch. The new nest also was deserted, on August 11, after I had weighed and measured the eggs. A third nest, probably built by the same bird, was found on August 13, in a nearby tree.

Nest B was deserted on July 28, when it was almost completed. On August 12, I found another nest about one meter from nest B and on the same branch. The (apparently) two females involved in nests A and B and subsequent nests mentioned above were incubating eggs on August 20.

Lesson's Emerald breeds also at the end of the year at the start of the short rainy season and in the following short dry season. I found a nest with one egg on November 3, 1951, and another nest with two young on November 17, 1948. These young left the nest on December 3. On December 30, 1949, I saw a bird building a nest, and on January 17, 1952, a hummer was incubating two eggs in a nest in my garden. Further, I found a hummingbird incubating two eggs on March 8, 1952. The latter date is in the short dry season.

In July, 1950, a nest was built in a Bougainvillea in my garden at a height of approximately 1.5 meters. This nest was just in front of one of my windows and thus offered an excellent opportunity to observe the birds during the entire breeding cycle.

I saw no courtship or territorial behavior. Only one adult was seen at the nest and I assume that this bird was a female, since male hummingbirds usually do not participate in nesting activities.

Nest-building

On July 25, I discovered, on a horizontal branch, the foundation of the nest last mentioned. On July 27, I saw the bird shaping the small nest cup by trampling with its feet as it stood in the nest and by pressing the underside of its bill and throat on the outer wall of the nest. On this date, the shallow cup was composed of white vegetable material. There were no lichens on the outer wall.

On July 28, between 15:25 and 15:42, the bird came to the nest eight times with nesting material. Again, it shaped the nest by trampling. During the trampling, the bird's entire body seemed to tremble. As the bird turned around in the nest, it often leaned to one side, at which time the movements of the foot on the opposite side could be seen distinctly. Nest-building ceased when a rain shower started.

On July 31, the first egg was laid (hour unknown) but nest-building was continued most energetically. The bird sat on the nest from 12:15 to 12:40; detailed notes taken between 13:30 and 14:30 follow.

The bird worked on the nest from 13:30 to 13:31; returned at 13:35, worked until 13:38; it then sat on the nest until 13:41; it left at 13:43. Returning at 13:44, it built until 13:45 and then flew away. I saw then that it was picking "wool" from an unidentified plant a short distance from the nest. It returned to the nest with a large piece of "wool," built, went back to the same plant, and returned to the nest with more "wool." At 13:47, the bird disappeared. It returned at 13:55, built until 13:57, left, returned at 13:58 for one minute, left again in one-half minute to make two quick trips for "wool." The bird left at 14:00 but returned almost immediately and worked on the nest; it sat and trampled. The bill was open although the nest was in shade. The bird left in half a minute and was back at 14:01, built, left, returned at 14:02, and departed in half a minute. It returned at 14:03, left at 14:04, and was building again at 14:05. It then remained on the nest until 14:09, then left. It returned with a large piece of "wool" at 14:10 and built for one-half minute and left. It was back again at 14:11, built, and left at 14:14; it returned in one-half minute. From 14:17 to 14:24, the bird worked on the nest. It then sat as though incubating until 14:27; it trampled in the nest until 14:29.

In one hour of observation, the hummingbird came to the nest 19 times with nesting material.

On August 1, the nest still held only one egg. The bird sat on the nest from 9:45 to 9:53. Between 11:05 and 11:30, it spent 23 minutes sitting on the nest and was absent four times in this period. The interval from the start of nest-building to the laying of the first egg was one week. As noted, however, nest-building continued through the day of laying of the first egg (see also below, under incubation).

That hummingbirds steal material from other nests is well-known. Skutch (1931) gives some examples of the destruction of nests of *Amazilia tzacatl* by other individuals of the same species. Fortunately, the nest I observed in 1950 did not suffer damage, although *Amazilia fimbriata* does steal nesting material from other birds.

FIG. 1. Lesson's Emerald (*Amazilia fimbriata*) at its nest. Photographed near Paramaribo, Surinam, on September 1, 1950, by Fr. Haverschmidt.

In December, 1949, I had under observation in my garden a nest of a flycatcher, *Camptostoma obsoletum*, in which two young had hatched on December 22. At 13:59 on December 30, I saw an *Amazilia fimbriata* alight at the side entrance to the domed nest, reach in and take some white "wool" from the inside of the nest, and fly with this material to its own nest, which was under construction rather high in a nearby tree. The hummingbird soon returned to the flycatcher's nest but was chased away by one of the parent birds. A little later the hummer visited the nest for the third time and took a rather large clump of "wool" from the inside. On December 31, I found the flycatcher nest in a deplorable state with the nest-lining much disrupted and the young gone. The *Amazilia* came three times in quick succession to

Table 1

Attendance of *A. fimbriata* At Nest. Letter "N" preceding time on nest indicates that adult returned at that time with nesting material.

Date	Time of Observation	Time On Nest	Time Off Nest
August 2	7:18– 8:18	7:18– 7:42	7:42– 7:51
		7:51– 8:18	
	13:25–14:25	13:25–14:25	
August 3	13:15–14:15		13:15–13:18
		13:18–13:33	13:33–13:35
		N13:35–13:43	13:43–13:44
		N13:44–13:45	13:45–13:46
		N13:46–	13:46–13:47
		N13:47–13:48	13:48–13:50
		N13:50–13:56	13:56–13:58
		N13:58–14:03	14:03–14:04
		N14:04–14:06	14:06–14:08
		14:08–14:13	14:13–14:15
August 4	13:55–14:55	13:55–14:55	
	15:50–16:50	15:50–15:54	15:54–16:02
		N16:02–16:13	16:13–16:17
		N16:17–16:19	16:19–16:20
		N16:20–16:27	16:27–16:31
		N16:31–16:37	16:37–16:42
		N16:42–16:50	
August 5	6:40– 7:40	6:40– 6:49	6:49– 6:55
		6:55– 7:22	7:22– 7:28
		7:28– 7:40	
August 6	6:28– 7:28	N 6:28– 6:38	6:38– 6:45
		N 6:45– 7:05	7:05– 7:13
		N 7:13– 7:28	
August 7	13:20–14:20	13:20–13:58	13:58–14:20
August 8	8:50– 9:50	8:50– 8:59	8:59– 9:00
		N 9:00– 9:01	9:01– 9:02
		N 9:02– 9:04	9:04– 9:05
		N 9:05– 9:07	9:07– 9:10
		N 9:10– 9:12	9:12– 9:13
		N 9:13– 9:24	9:24– 9:28
		9:28– 9:29	9:29– 9:31
		N 9:31– 9:39	9:39– 9:41
		9:41– 9:43	9:43– 9:49
		9:49– 9:50	
August 9	14:25–16:15	14:25–14:28	14:28–14:46
		N14:46–15:22	15:22–15:32
		N15:32–15:33	15:33–15:38
		N15:38–16:15	
August 10	14:25–15:25	14:25–14:30	14:30–14:31
		N14:31–14:33	14:33–14:42
		N14:42–15:25	
August 11	15:13–16:38	15:13–15:41	15:41–16:06
		N16:06–16:10	16:10–16:38
		N16:38–	
August 12	15:00–16:30		15:00–15:17
		15:17–15:55	15:55–16.03
		N16:03–16:30	
August 13	7:55– 8:55	7:55– 8:32	8:32– 8:45
		N 8:45– 8:55	
August 15	7:25– 8:25	7:25– 7:55	7:55– 8:06
		N 8:06– 8:25	

steal material for its own nest. On one visit the hummingbird was chased away by an adult *Camptostoma*.

Egg Laying

The eggs of Lesson's Emerald apparently are laid on alternate days. In the nest which I observed in 1950, the first egg was laid on July 31, the second on August 2. In a nest built in my garden in 1951, the first egg was laid on August 8, and the second on August 10. In another, the first egg was laid November 3, the second November 5, and in still another nest, the first egg was laid March 6, the second March 8. The measurements of the eggs in the second nest mentioned were: 13.3×8.5, and 13×8.4 mm. These eggs weighed 0.55 and 0.50 grams, respectively.

Incubation

Building and maintenance of the nest studied in 1950 continued through the incubation period up to the day of hatching of the first egg. Not only did the maintenance of the inner and outer walls of the nest continue through incubation, but it was during this period especially that the adult plastered the outside of the nest with pieces of light green lichens. There were few lichens on the nest at the start of incubation. At the end, the entire outer wall was covered with lichens. The bird often returned after a break in incubation with either a piece of white "wool" or of lichen, although it never carried more than one piece at a time.

Table 1 summarizes my observations of the bird's behavior over one-hour periods during incubation.

While incubating, the bird was restless. It often altered its position when sitting. To illustrate its behavior, I give here an extract from my notes on one hour of observation on August 13:

> At 7:55, bird sits with head turned to right (in reference to me) and tramples with its feet; 8:00, tramples, turns counter-clockwise until its back is toward me; 8:07, turns counter-clockwise and sits with head toward me; 8:25, tramples, and nibbles with bill at piece of lichen on the outside of the nest; 8:32, leaves nest, is back at 8:45, with a piece of green lichen which it fastens on the upper part of the outer wall of the nest, sits with head toward me; 8:48, turns counter-clockwise, nibbles at wall of nest, sits with back toward me; 8:51, turns counter-clockwise until head is toward me, tramples and nibbles wall of nest while turning; 8:54, still constantly trampling and nibbling and turning counter-clockwise; 8:55, still incubating.

During rain showers, the incubating bird "spread out" in the nest and pointed its head obliquely upwards so that the rain fell from its plumage. When the nest was in full sunshine, at about noon, the bird stood up in the nest with its bill open and its wings pressed closely to the body.

When incubating, the bird seemed constantly alert; only once, on August 9, at 15:12, did I observe it to stretch its wings, after which it yawned several times and dozed with closed eyes. It awoke at 15:20 and stretched its wings again.

Incubation started with the laying of the first egg (on July 31). The first young hatched on August 16, 16 days later. Incubation does not always start with the laying of the first egg. In a nest in my garden in March, 1952, the first egg was laid on the 6th, the second on the 8th. The adult did not start incubating until March 8. The first egg laid hatched on March 22 at 15:00, when the shells were still in the nest. The second egg hatched before 6:45 on March 24. In this case, the incubation period was 15 to 16 days. This agrees with the incubation period of *Amazilia tzacatl* as determined by Skutch (1931:500 and 1945:16). Muir's (1925:651) observations on *Amazilia tobaci erythronotos* in Trinidad give a much longer period of 21 days. It is clear from Muir's notes that incubation did not start for some time after laying of the first egg.

Rearing of the Young

I did not see the second egg hatched since I was absent from my home from August 17 to August 21. Throughout the nestling stage, the two young differed markedly in size and they did not leave the nest on the same day.

The newly-hatched nestling is pinkish below and blackish above with a little golden-colored down on its back and head. The mouth-lining is orange, similar in color to the pulp of the fruit of the papaya, *Carica papaya*.

Table 2 gives the weights of the young from August 22 to fledging. Also, the weight of the first nestling on the day of hatching is given.

When the young were small, the adult brooded them after feeding and during the night. Brooding was last seen on August 27, when the larger nestling was 11 days old. At this time, the adult could scarcely cover the young. When the sun shone directly on the young, the adult stood straight up in the nest with its neck stretched upward and its bill held horizontal and opened widely. The wings drooped; the feathers of the back and rump were ruffled, giving the bird a rough appearance. When brooding during rain, the adult sat with its head and bill turned obliquely upward and with its feathers tightly appressed to the body.

The young sat tightly in the nest, clinging to the bottom with their claws. This was important since the branch bearing the nest was often swept to and fro in the wind.

Individual nestlings were fed only when they begged by gaping; the adult invariably fed only the gaping nestling. Figure 1 shows the characteristic posture of the young while begging. Note that the back of the head rests on

TABLE 2

DAILY WEIGHT OF THE YOUNG IN GRAMS

DATE	NESTLING 1	NESTLING 2
August 16	0.4	
August 22	2.55	1.7
August 23	2.58	1.96
August 24	2.75	2.3
August 25	3.13	2.67
August 26	3.1	2.66
August 27	3.28	2.91
August 28	3.52	3.1
August 29	3.8	3.53
August 30	3.98	3.8
August 31	3.97	3.7
September 1	3.92	3.65
September 2	3.9	3.75
September 3	3.8	3.7
September 4	4.0	3.65
September 5	4.0	3.92
	leaves nest	
September 6		3.7
September 7		4.0
		leaves nest

the back of the young bird during gaping. The nestlings often turned around in the nest, at times facing in the same direction, at other times in opposite directions.

Table 3 gives records of feeding of the young during one-hour periods of observation. These records show that frequently the nestlings are fed more than once on each feeding trip by the adult.

I first saw defecation by the young on August 23, when the larger nestling was seven days old. The young bird shuffled to the edge of the nest, pointed its anus upward, forcibly expelled a spray of colorless, fluid feces a considerable distance from the nest, and shuffled back into the nest cup. On August 26, I observed that the feces, for the first time, although exuded in the manner described above, contained of a semi-solid black substance. Muir (1925) observed in Trinidad that an adult *Amazilia tobaci* cleaned the nest of feces from the start of the nestling period. I have not seen nest-cleaning by adults of *Amazilia fimbriata*.

On August 30, when the older nestling was 14 days old, I first saw wing-exercising by the young. One nestling stood in the nest and buzzed its tiny wings in characteristic hummingbird manner. Thereafter wing-exercising, and also preening, became a regular pastime. I noted also that frequently the young hummingbirds scratched their heads with their feet. They did this

TABLE 3

FEEDING OF THE YOUNG

DATE	TIME	NUMBER OF FEEDING VISITS	PORTIONS FED TO:	
			NESTLING 1	NESTLING 2
August 22	15:10–16:10	1	1	0
August 23	6:30– 7:30	2	3	1
	14:18–16:18	7	5	3
			5	0
			1	1
			1	2
			1	1
			1	0
			1	1
August 24	6:13– 7:13	2	2	2
			3	1
	14:35–15:35	4	1	1
			3	2
			2	2
			2	1
August 25	7:20– 8:20	2	3	2
			5	4
	14:40–15:40	2	3	3
			3	0
August 26	16:10–17:10	2	3	2
			3	2
August 27	11:00–13:00	6	4	5
			2	2
			2	2
			2	2
			2	2
August 28	14:40–15:40	1	4	0
August 29	15:16–16:16	2	2	2
			2	1
August 30	15:25–16:25	2	3	0
			1	1
September 1	15:00–16:00	1	2	2
September 2	15:25–16:25	2	1	1
			1	0
September 3	13:15–14:15	2	3	1
			2	2
September 4	14:30–15:30	1	1	1

September 5, nestling 1 leaves nest at about 15:00.
September 7, nestling 2 leaves nest at about 13:00.

"over the wing," as I have observed to be the case in the hummingbirds *Anthracothorax nigricollis* and *A. viridigula*. In a half hour period on September 4, one day before the oldest young left the nest, I made the following observations relative to exercising.

At 14:33 older nestling stands in the nest and buzzes with its wings, as does the other one while sitting; 14:35, older nestling again wing-exercising then both young preening; 14:37, wing-exercising of smaller young while standing in the nest; 14:39, older nestling scratches its head with its foot over its wing; 14:50, smaller nestling does same; 14:52, both young busily buzzing with their wings after having been fed by the parent, older young standing on the wall of the nest; 14:59, older nestling wing-exercising; 15:04, smaller young does the same, then scratches its head.

FIG. 2. Nineteen-day-old nestling of *Amazilia fimbriata*, one day before leaving the nest. Photographed near Paramaribo, Surinam, on September 4, 1950, by Fr. Haverschmidt.

On September 4, I photographed the older nestling (fig. 2). When I held it, it buzzed vertically upward from my hand.

When the young hummers leave the nest they are duller in color than the adults, especially on the underparts, which are brownish instead of bright green. The bill of the young at this time is strikingly shorter than in the adults (compare figs. 1 and 2).

The older young left the nest on September 5, at approximately 15:00. I found it sitting at a height of three meters on a branch of a coffee shrub about ten meters from the nest. The adult fed the fledged young in the shrub after first feeding the young in the nest. At 15:30, the nestling had left the shrub

and was perched on a wire near the house at a height of six meters. Here it spent the night and was still on the wire at 8:00 the next morning. The other nestling left the nest at about 13:00 on September 7, when I found it sitting on the same wire. On September 10, I again saw the adult feeding one young near the nesting site. On October 10, I watched a young Lesson's Emerald as it was fed by an adult near the nest, but I am not sure that this young was from the brood described above.

The young, according to my records, leave the nest only when they can fly well. The nestling period in the brood that I studied was about 20 days.

Bathing and Sunning

Lesson's Emeralds bathe regularly. I observed two general methods of bathing, the most common of which is a shower-bath in the rain, a type of bathing indulged in by many other birds in this region. During a rain shower, the hummer perches in an exposed spot with its tail widely spread and its body feathers ruffled. The neck and head are held vertically. While perched in the rain, the bird flaps its wings, opens and shuts its bill, preens, scratches (over the wing), waggles its tail, and frequently wipes its bill on its perch.

The second method of bathing I have called the "rubbing bath." This I first saw on September 14, 1946, when, during a heavy rain-shower, a Lesson's Emerald in flight rubbed its breast and belly over the drenched foliage of a *Terminalia catappa*, the leaves of which are large and leathery. The bird repeated the rubbing again and again until its underparts were thoroughly wet.

While sunning, the hummers sit facing away from the sun, wings closed, but with the body feathers ruffled and the primaries spread.

Food

Amazilia fimbriata feeds from flowers not only while hovering but also while perched. In addition to nectar-feeding, I have twice seen *Amazilia* apparently taking sand. On December 11, 1951, and again on January 13, 1952, I saw a hummer hovering only a few centimeters over a patch of fine dry sand near my house in Paramaribo. The bird touched the ground a few times with its bill. Although I could not actually see the bird pick up sand, it seemingly was doing so. I could find no insects on the sandy patch.

Fighting

Amazilia fimbriata, like other hummingbirds, is quarrelsome with birds venturing near its nest. On July 23, 1951, a juvenile kite, *Milvago chimachima*, alighted on a branch near a hummer's nest in my garden. Immediately, the hummingbird began diving at the large hawk; the latter ducked its head

at each dive and it soon departed. On September 25, 1950, I saw an adult *A. fimbriata* hotly pursuing a *Buteo magnirostris* through my garden. Small birds such as thrushes (*Turdus leucomelas*) usually immediately retreat from an attack by hummers.

Summary

The foundation of a nest of Lesson's Emerald was found on July 25, 1950. Nest-building lasted for about a week, except that maintenance and plastering of the nest with lichens continued until the first egg hatched.

Incubation began with the laying of the first egg on July 31. The second egg was laid on August 2. The incubation period was approximately 16 days.

The adult made one to four feeding trips per hour, but fed several portions at each trip.

The young left the nest at 20 days; at this age they could fly well.

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P. O. Box 644, Paramaribo, Surinam, Dutch Guiana, March 23, 1952

A NEW RAIL FROM THE PLEISTOCENE OF FLORIDA

BY PIERCE BRODKORB

AMONG recently collected bird material from Pleistocene deposits in Florida are three humeri of a tiny rail of the genus *Laterallus*. The modern species of this genus are rare in collections, and this has been a handicap in determining the affinities of the fossil form. Fortunately this genus does not exhibit the marked sexual dimorphism in size shown by some other rails. Skeletal material of recent species of *Laterallus* was examined through the kindness of the curators of the Chicago Natural History Museum, United States National Museum, and the University of California Museum of Vertebrate Zoology. The drawings (Fig. 1) were made by Miss Esther Coogle.

***Laterallus guti*, new species**

Type.—Nearly complete left humerus; collection of Pierce Brodkorb; Pleistocene at Dixie Lime Products Company quarry, one mile south of Reddick, Marion County, Florida; collected by H. James Gut, June 4, 1951.

Description.—Bone agreeing in general conformity with that of other species of *Laterallus*. Head of humerus rounded in outline, with slight indication of external tubercle; anconal surface relatively flat, with no pneumatic foramen; capital groove broad and deep and set at an angle of about 45 degrees to the shaft; proximal margin of bone faintly scalloped in region of capital groove; internal tuberosity broken off in type, but its internal margin not abruptly deflected from head; deltoid crest partly broken in type, but rising abruptly from palmar surface; ligamental furrow present but rather shallow; bicipital furrow obscure; shaft robust, bent inward at a slight angle above middle, and with a ridge along midline of proximal portion of anconal surface; a slight ectepicondylar prominence; internal condyle nearly the same length as entepicondyle, and both extended beyond external condyle; brachial depression pronounced and undivided. Color pale brownish.

Comparisons.—Of the species of *Laterallus* available for comparison, the fossil most closely resembles *L. jamaicensis* (Gmelin) of North America. The humerus of the fossil is only slightly longer than that of *L. jamaicensis* but is decidedly more robust. The capital groove is deeper, with its margin slightly more produced and less sinuate. The internal tuberosity is larger and has more nearly flat articular surface. The shaft is bent more strongly inward. The ectepicondylar prominence is larger and is concave distally where its lateral margin meets the external condyle. The internal condyle is larger in *L. guti*. The external distal border of the brachial depression is more raised. The olecranal fossa is deeper.

The fossil differs from *L. ruber* (Sclater and Salvin) of Middle America in lesser breadth of the distal end, although the width of the shaft is the same. The entepicondyle is not produced so far beyond the internal condyle in the fossil, and the internal condyle is smaller. The brachial depression is notice-

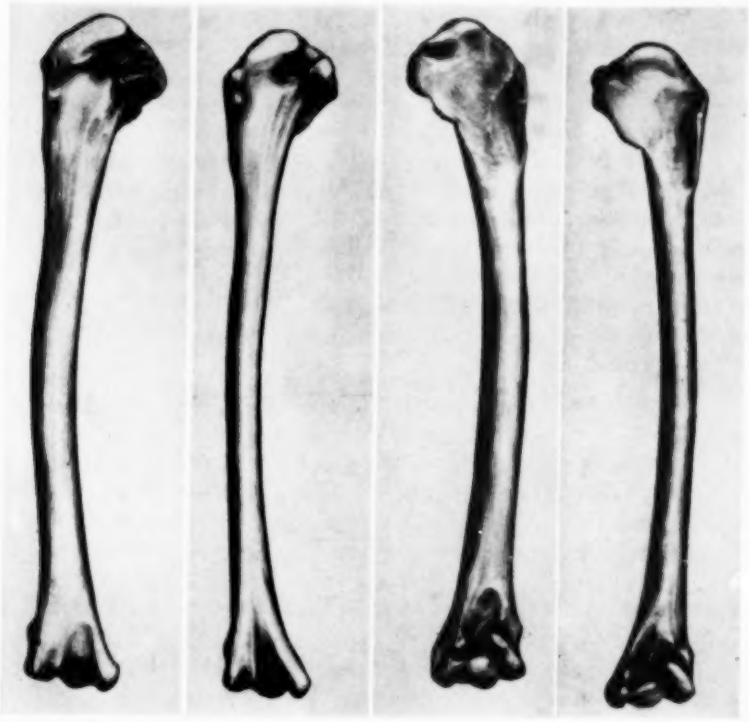

FIG. 1. Humerus of *Laterallus*. Left and third from left, *L. guti*. Second from left and right, *L. jamaicensis*. About three times natural size.

ably shallower than in *L. ruber*. The proximal end of the humerus of *L. ruber* is unfortunately not available.

From *L. viridis* (Müller) of South America, the fossil differs in having a decidedly smaller humerus in all measurements. The caput humeri of *L. guti* is more attenuate and less broad. The articular surface of the internal tuberosity is more nearly flat in the fossil, and there is less sinuation at the proximal border of the capital groove. The entepicondyle of the fossil is less

produced. In *L. viridis* the brachial depression is divided diagonally by a ridge.

From *L. leucopyrrhus* (Vieillot) of South America, the fossil differs in being smaller throughout. Further, the external tuberosity is much less pronounced, the external tricipital groove is shallower, the ectepicondylar prominence is larger, and the entepicondyle is not extended so far beyond the internal condyle.

I have also examined a partial skeleton of the Central and South American *L. melanophaius* (Vieillot). The humerus was not included, but the other skeletal elements indicate a bird nearly as large as *L. viridis*.

Referred material.—In addition to the type, two fragmentary humeri are available from the same locality. I collected the proximal portion of a right humerus on June 4 and the distal portion of a right humerus on June 24. At least two, and probably three, individuals are represented by the three specimens.

Measurements.—Measurements in millimeters of the fossil species and those of allied species are given below. For each measurement that of the type of *L. guti* is given first.

	guti	*jamaicensis*	*ruber*	*viridis*	*leucopyrrhus*
Length of humerus	24.2	23.5	...	28.2	...
Width of proximal end	4.5, 4.8	4.0	...	5.7	5.6
Width of distal end	3.3, 3.3	3.1	4.2	4.2	4.1
Width of shaft	1.5, 1.5, 1.6	1.2	1.5	1.8	1.7

Department of Biology, University of Florida, Gainesville, Florida, January 2, 1952

THE DISPLAYS AND CALLS OF THE AMERICAN COOT[1]

BY GORDON W. GULLION[2]

DISPLAYS and calls are of paramount importance in the social behavior of birds. A call or the exposure of some bright plumage spot may serve as a social releaser to communicate one bird's attitude or intentions to other birds, whether aggressive or friendly. This being the case, it seemed desirable to investigate in some detail the displays and calls of the American Coot (*Fulica americana*) in order to understand properly the breeding behavior of this species. This paper presents a segment of thesis research conducted at the Museum of Vertebrate Zoology, University of California, at Berkeley, on coot breeding behavior. Some other aspects have been published or are in press (Gullion, 1950b, 1951a, 1951b, 1952).

The greater part of this study was made in the San Francisco Bay area of California, with two lakes figuring prominently—Lake Temescal, a 12.0 acre lake at the western base of the Berkeley Hills in Oakland, Alameda County, and Jewel Lake, a 2.7 acre pond in Tilden Regional Park, Contra Costa County.

Display Mechanisms

The American Coot is highly territorial in behavior, perhaps more so than most other birds, and must constantly fend off the invasion threats of other coots. Among resident birds this is true even during the winter season. Displays and calls constitute the aggressive behavior which serves to establish and maintain territorial security.

Displays by the coot consist of five elements used in various combinations. These elements are as follows:

Body posture.—Three different postures constitute the bases for coot displays. The normal posture with head and neck erect is the basis for amiable displays. But a coot with its head depressed is in a posture characteristic of any one of the several aggressive displays. The third posture, that of a bowed head, constitutes the basic form of courtship and mating displays.

Under tail coverts.—Several of the American Coot's displays are based upon the use of the white under tail coverts as "social releasers" (*cf.* Tinbergen, 1948). These coverts may be expanded to present an extensive area of white or they may remain in the inconspicuous normal condition presenting only a small patch of white. The position of the tail, whether normal, depressed, or

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[1] A contribution of the Museum of Vertebrate Zoology, University of California, Berkeley.
[2] Wildlife Technician, Nevada State Fish and Game Commission.

raised, increases the usefulness of these coverts by further increasing or decreasing the amount of white visible.

Wing arching.—This element is important in most displays. It often is the difference between a certain body posture indicating either an anti-social or a definitely sociable attitude. In the typical wing arch, the wings are held stiffly erect and apart from the body (see figs. 1D, 1E, 2C and 2D). Whether or not the white tips on the secondaries play a part in the recognition of this arch is not known.

The ruff.—In all aggressive displays the neck feathers are erected to form a ruff (see fig. 2A). The effect is one of increased neck size, forming a black background for the conspicuous red and white frontal shield. It was found that males are capable of forming a much larger ruff than their mates and when a pair is displaying together, as in nest defense, the sexes can be distinguished on this basis. With one exception, the ruff is not erected in friendly or courtship displays.

Frontal shield.—This structure, a fleshy protuberance extending dorsoposteriorly onto the forehead from the upper mandible, plays an important role in the social life of the coot. Since a paper devoted to a study of this structure is in print (Gullion, 1951b), further consideration of it will not be given here.

Although calls and displays are used to supplement one another in the field, for the sake of clarity they will be discussed separately.

Displays

American Coots combine the five elements discussed above to form fourteen distinct displays in addition to the normal position. Apparently each display has a certain social significance. Five are intra-specific aggressive displays and two are inter-specific aggressive displays concerned with territorialism; five more are involved in courtship; one is a general warning display; and one, a display given by young begging food from adults.

Normal posture.—This is the posture held by a coot when foraging undisturbed (see fig. 1A). The head is erect, the tail is held horizontally with the under tail coverts inconspicuous. The wings are held close to the body. As the coot swims in an unhurried manner, its head bobs, applying the principle of parallax to its feeding (*cf.* Grinnell, 1921). Head-bobbing of the coot is not necessarily in unison with the movements of the feet. When the bird is feeding on plant material this head movement is fairly slow, but it is quickened when insects are being hunted on the water's surface.

Patrolling.—Seemingly, whenever a coot has reason to believe some aggressive action may be necessary against other coots approaching its territory,

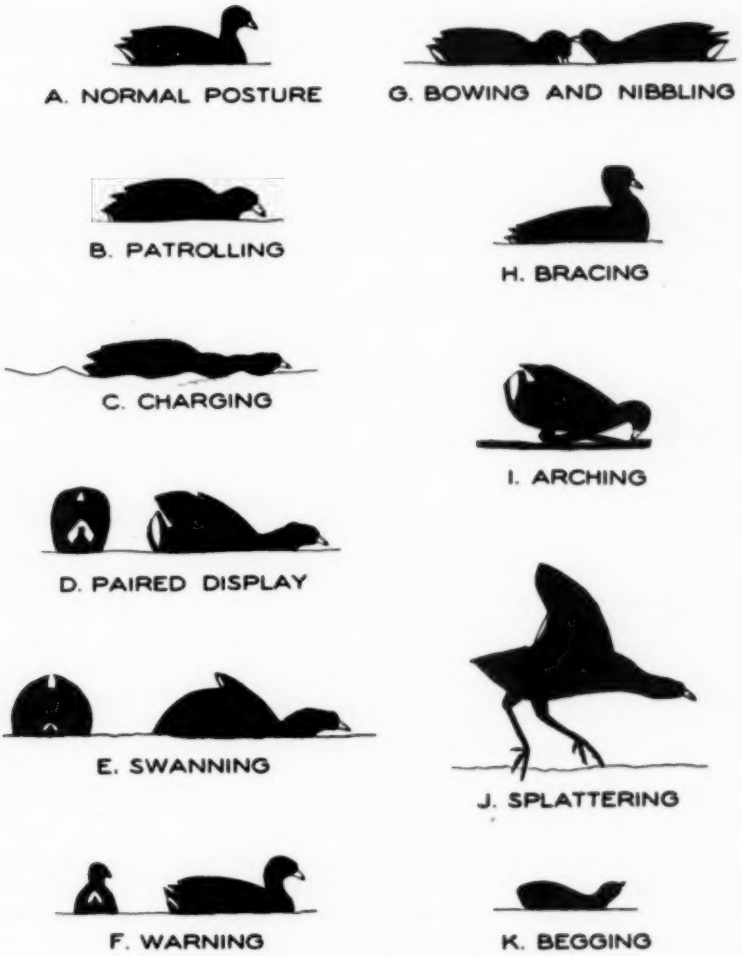

FIG. 1. Display postures of the American Coot.

it pulls its head down and slightly forward, the neck feathers are erected to form the ruff, the tail is slightly depressed and a patrol against invasion commences (see figs. 1B and 2A).

A bird may proceed to further aggressive display or retire to the normal

posture from this position. Other coots, but not other species (except the Ruddy Duck, *Oxyura jamaicensis*), respect this display and often no further display is necessary to defend territory intra-specifically. The patrol is seldom accompanied by call notes.

Charging.—If an intruder enters a territory before the resident bird can go into patrol the defender generally moves toward the invader in a charge (see figs. 1C and 2B). In this display the neck is extended forward on a horizontal plane, the tail and wings are held in the normal position, but the ruff is erected and the frontal shield is prominent. The bird swims rapidly leaving a noticeable wake.

All species of ducks and small geese occurring in the San Francisco Bay area react to this display and other coots often take evasive action while still 100 feet from the charging bird.

Splattering.—This display is a rapid charge. The bird retains essentially the same head posture as in the charge while it runs over the water with flapping wings (see fig. 1J). The attacked bird very often flees in like manner, but holds its head erect rather than on a nearly horizontal plane (see fig. 2F). Splattering normally begins as a charge, the bird gradually increasing its speed, but occasionally, if the circumstances require it, a splatter may commence directly from the normal posture.

This form of attack may be pressed against other species of waterfowl as well as coots and because of the intensity of the attack it generally succeeds in its purpose. Frequently a fleeing coot when closely pursued will dive to escape its attacker.

It should be pointed out that splattering is used also as a means of escaping danger when flight is not necessary. It then is not a display and the head is not held at the low angle of the display (see fig. 2F).

Paired display.—This display is used entirely in intra-specific territorial activity, and always occurs in connection with strife and usually along territorial borders. This display is normally the final action of aggression and regularly follows charging and splattering. In paired display the head is held low, the wings are arched high above the back, often with tips crossing, and the tail is held vertically, or even tilted over the back, bringing the expanded white under tail coverts into prominence (see fig. 1D). The ruff is erected and the frontal shield is prominent.

It must involve two or more coots if it is to be more than a fleeting display, with the birds presenting their tails to one another as they pivot close together (see fig. 2C). Non-territorial birds engage in this display infrequently but the border disputes between territorial birds often involve repeated displays lasting several minutes at a time. As many as seven coots have been seen in mutual display. Generally like sexes reciprocate in display, but frequently a

pair will display against a single bird. This latter incident occurs most frequently when a chase carries the pursuing bird into the pursued bird's territory.

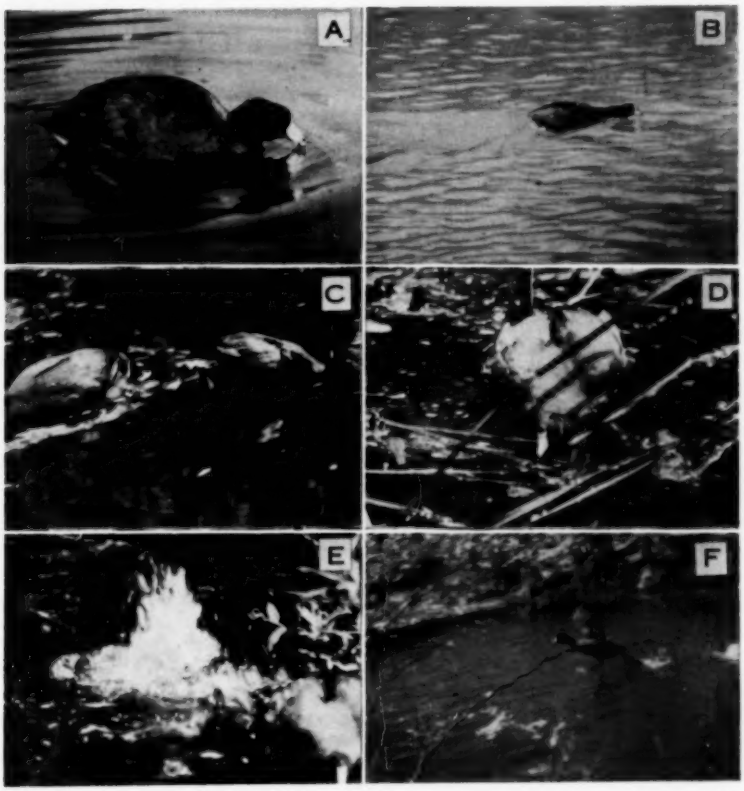

FIG. 2. A. A coot patrolling—note the ruff; B. A coot charging; C. A paired display with two coots pivoting tail to tail; D. A coot swanning; E. A male coot churning while his mate swans nearby; F. A coot splattering to escape its pursuer.

Paired display often is interspersed with fighting and nearly always follows a fight; it in turn is generally followed by "displacement feeding and preening" (Armstrong, 1947:110), the separated birds preening and diving for food which is seldom eaten but is dabbled nervously. During displacement activity the opposing birds slowly work apart, each moving into its own home area.

Paired display is not sexual behavior as believed by many authors (*cf.* Wetmore, 1920:395; Dawson, 1923:1559; Townsend, 1925:6; Walker, 1932:322 and Breckenridge *in* Roberts, 1932:457).

Fighting.—The climax of aggressive action is actual combat. In coots this is vicious and has been known to result in the death of the vanquished bird (Henshaw, 1918). In most disputes between neighboring pairs the fighting is interspersed with paired display, the latter act consuming much the greater part of the effort. Previous display does not always occur before fighting starts, especially if the issue is territory and the intruding bird is determined to secure it.

When birds are about evenly matched in determination, the fight starts with both birds sitting on their tails, propped against their wings on the water. Their adversary is grasped by the breast with the long claws of one foot, leaving the other foot free to slap the opponent. Frequent quick jabs with the bill are made to knock the opposing bird off balance but usually result only in a bill full of feathers. As the fight progresses the weaker bird is slowly forced onto its back. If possible, the stronger bird will hold the loser under water, leisurely plucking out feathers. The vanquished coot often escapes by swimming long distances under water.

Strange coots caught in territorial waters without a disposition to fight are frequently subjected to sub-surface mauling. Defending birds will hit other coots directly from flight without landing first and have been seen diving after an intruder directly from full flight. Underwater fighting certainly occurs but what form it takes is not known.

Infrequently as many as four birds may be engaged in one fight. The typical fighting posture has been observed in coots only four days old.

Swanning.—This is distinctly an inter-specific display given against such diverse objects as thrown stones, fishing plugs, turtles, snakes, ducks, Black Phoebes (*Sayornis nigricans*), dogs, and man. It seems to be employed almost exclusively in defense of nests or young.

Unlike paired display, the wings play a dominant role in swanning, being not only arched over the back, but also expanded laterally with the primaries touching the water. The tail is not lifted to expose the under tail coverts but the head is extended as in paired display, the ruff is erected and the frontal shield is prominent (see fig. 1E). The whole effect makes a coot appear at least twice its normal size (see fig. 2D). Occasionally during times of extreme anxiety a bird defending a nest will lapse into a momentary paired display.

Churning.—This display is intimately related to the four combative displays just described. Bent (1926:364) gives the best description of this activity when he says, "it often 'backs water' vigorously with both feet, raising

the body backwards out of the water" (see fig. 2E). The feet are used alternately in this action.

Churning is primarily a displacement activity arising from two different circumstances. Most frequently it occurs when swanning or some other effort fails in the defense of the nest or young. Churning occurs also when success in aggressive action is attained so rapidly that the bird seems to be left with a surplus of aroused energy and 'lets off steam' by this action.

Warning.—Whereas the preceding displays are anti-social, the warning display is sociable, warning other coots of danger. An alarmed bird lifts its tail exhibiting the white under tail coverts but not expanding them (see fig. 1F). This seems to be the only general alarm signal given by coots. It is seen when a low-flying hawk, vulture, or airplane is overhead, when a dog, cat, or man suddenly appears close by on the shore, or when the coot is some distance away from, but in the general line of attack of, a charging coot. It probably is given as a result of any general alarm and it may be momentary, or repeated at frequent intervals if conditions change rapidly, or it may be maintained continuously if the cause for alarm persists. There is no indication that other species respond to this display.

Billing, bowing and nibbling.—These displays, though separate entities, are so closely related that it seems best to treat them together.

Billing, as the name implies, consists of two birds touching bills upon meeting. It apparently is used between potential mates during pair formation and for recognition of young by parents.

Bowing follows billing, the submissive bird going into a bow (see fig. 1G, left bird) and presenting its head and neck to the nibbling activities of the dominant bird. The nibbling bird works its bill through the feathers of the other bird, often burying its entire bill among the breast and back feathers.

Since these actions are important in pair formation and courtship they will be discussed in detail in a later paper (see also Gullion, 1950a:74–75).

Bracing.—The brace is not completely understood. It was observed on relatively few occasions and each time it immediately followed a meeting after a period of separation. It has been observed only among paired coots; both sexes participating in it. Bracing consists of a swimming bird raising the forepart of its body high in the water with the ruff erected and the head stiffly erect (see fig. 1H).

It occurs when one bird meets its mate returning to the nesting area, both birds approaching in a charge, dipping their bills as they pass and then bracing. Bracing also occurs, and more frequently, during change in incubation. Then the female braces and cackles as the male, often giving a high "*kuk-kuk-kuk-kuk-kuk*," closely pursues her. I am not sure, however, that the

brace executed on this occasion is exactly comparable with that display performed when two charging birds of the same pair meet. The brace may be given also by the female as she precedes the male to a platform when copulation is imminent.

Arching.—This display consists of three parts. After the pair is formed and territory secured, the female commences displaying her under tail coverts when swimming immediately ahead of her mate. This display, the *swimming arch*, is much like paired display but the wings are not arched nor is the ruff erected. It is only given by the female and she often leads the male towards the display platform while giving it. At first this is an infrequent and momentary display but later in the season it becomes more frequent and persistent.

The display given on a platform when copulation is not imminent is the *standing arch*. It is performed by the female standing with her head lowered, her tail elevated and the white under tail coverts expanded. She gives a low "*tuk*" or "*punt*" at about two-second intervals and often slaps the platform with one foot.

The final and climactic display in the long series of courtship displays is the *squat arch* (see fig. 11). This is given by the female on the platform when the male is nearby and copulation appears imminent. The female squats, with her tail erect (as in the standing arch), her head lowered (even under water), and she may call as in the standing arch.

Although arching seems to be primarily a female display one captive male was observed in a squat arch. On several occasions males were seen standing on display platforms in an upright position and giving a steadily-repeated "*puhk.*" Generally they preened and often slapped the platform with one foot while their mates swam nearby.

Begging.—This display is first given by young coots when they are a few hours old and they continue to give it as long as their parents react favorably to it. It is a simple display, the hind quarters being elevated, the neck depressed and the head turned up at a sharp angle (see fig. 1K). The wings are outspread and generally quiver. Begging does not seem to be a forerunner of any adult display.

The role of the sexes.—Males take the lead in aggressive displays; normally they attack intruding males first and then return to drive out any invading females. Curiously, this is true even when the attack is pressed against a pair of Mallards (*Anas platyrhynchos*) or Ruddy Ducks. However, if the male coot is not available when the territory of a pair is invaded, the female will assume aggressive displays, attacking females first and males second. The courtship displays are often unisexual as described, while the alarm display may be given by either sex.

Call Notes

The calls of coots are not of musical quality, the calls being variously described as growls, cackles, and squawks. Calls are important in the life of coots in warning other birds of territorial rights or mutual dangers, in locating and recognizing mates and young, and in defending nests or brooding sites. Attempts to transcribe bird calls into phonetic symbols are never entirely successful, since various persons may interpret the same sounds differently. Nevertheless, an attempt was made to record and interpret the principal calls of coots in my study areas. The several types of calls fall into several categories as described in the following paragraphs.

Recognition notes.—The notes exchanged between birds of a pair or between parents and young are simple and rather uniform throughout the population. Between adults, the male gives a high, clear "*puhk*" and the female replies with a low, nasal "*punk.*" When calling or dealing with young the male gives a clear "*puht*" while the female gives a nasal "*punt.*"

Courtship notes.—In courtship the vocal efforts of the male are limited to a cough, given while chasing the female in precopulatory activity. In some males this cough becomes a sharp "*perk*" or "*kerk*" repeated at very close intervals. If, during a chase, the female is not amenable to mating activity, she faces the male and gives a saucy, cackling "*tack-tack, tack-tack*" which halts the affair. When the female is displaying on a platform, calling for the male to join her, she gives a note that varies from a low, nasal "*punt, punt*" or "*put, put*" to a sharp, clear "*tuk, tuk.*"

Alarm notes.—The normal alarm note for a disturbed male is a "*puhlk,*" while the female gives a "*poonk.*" Whereas the recognition notes involve no vigorous movement, alarm notes are given with a vigorous forward thrust of the head. In time of stress the young are sent to shelter by an explosive "*chuck*" or "*chook*" note of the male or the quick nasal "*punt-unt*" of the female.

When the nest is approached by an intruder or young cannot be moved away rapidly enough, both parents may "growl" at the intruder, sounding much like a dog growling over a bone. This is normally accompanied by swanning and churning.

Perturbation notes.—During times of high nervous tension, as when territory-seeking pairs are trying to seize existing defended areas, calls are given which are not heard at other times. These calls are given by the defending birds as they retire from repulsing one onslaught and nervously await the next. The call given by the male is a plaintive, crowing "*puhk-cowah*" or "*pow-ur*" while the female gives a simpler "*cooah.*"

A male at Jewel Lake in 1950, following the unexplained disappearance of

his mate, wandered around the pond several days giving a wailing "*cow-wah*" before disappearing himself.

Warning notes.—Vocal efforts are used extensively in the protection of nesting areas and to warn birds when they are violating or about to violate another coot's territory. These calls are highly variable, but in the male they may be described as a quick "*puhk-at*," "*puhk-uhk*," "*puhk-uk*," "*puhk-kuk*" or "*pit-tuck*." The female variations are "*punk-unk*," "*punk-uh*," "*punk-unk-uh*" and "*punk-tunk-tunk*," all nasal in tone.

Intimidation notes.—A paired coot often moves to the limits of his territory and crows. This is seemingly a challenge to other males to violate his territory. The crow is basically three-parted, loud, and not often repeated. It may be transcribed as a "*puhk-kuh-kuk*," "*puh-koo-oot*," "*kuh-kuh-kuk*" or "*cook-uh-ook*." Frequently a male from an adjoining territory will accept the challenge and move quietly but quickly to engage the crowing male in battle.

Females give a comparable call, which is a hollow crowing sound that varies from "*kaw-pow*" and "*kah-kow*" to "*kra-kow*." This is seldom a challenge; at least, a fight has never been seen to ensue and usually the call is given following crowing by a male elsewhere on the lake.

Sexual dimorphism in vocal apparatus.—Since the morphological basis of sexual differences in voice indicated above is the subject of a previous paper (Gullion, 1950b), it will not be discussed further here.

Discussion

Perhaps the displays of the American Coot have been less understood than any other part of the behavior of this species. The patrol activity seems to have been entirely overlooked by earlier authors. Wetmore (1920:395) describes bracing, Bent (1926:364) describes swanning, and Dawson (1923:1557 and 1560) describes the alarm signal and churning. Nearly everyone who has written about the coot describes splattering. The same may be said for the paired display, but invariably it has been wrongly associated with courtship. Wetmore (1920:395) discusses billing, while Breckenridge (*in* Roberts, 1932: 457) and Sooter (1941:38) both correctly describe arching as a precopulatory display on a platform. Sooter also accurately describes the swimming arch in Iowa coots.

Displays and calls of other Rallidae.—Nylund (1945:108) shows four displays of the Black Coot (*Fulica atra*), illustrating (1) paired display, (2) the male following his mate in precopulatory display, (3) a young coot begging, and (4) a begging young too old to stimulate parental feeding being attacked by a parent. These illustrations appear to be identical with the cor-

responding displays of the American Coot. Later, in his English summary (p. 121), Nylund states: "The coots show no marked display behavior," a statement which hardly agrees with his earlier discussion or the findings of others studying the Black Coot.

Witherby *et al.* (1947:205) describe paired display, bowing, and nibbling in the Black Coot while Cramp (1947) describes splattering in addition to these other three displays. A swimming arch immediately preceding copulation in the Black Coot was reported by Höhn (1949:209). Tinbergen and Moynham (1952:21), discussing some displays by birds, state: "A male Coot, for instance, threatens other Coots by facing them with the head pointing forward and downward. This movement displays the white frontal plate . . .." They also describe a "friendly gesture," which may correspond to the patrol, in which the conspicuous white bill and frontal shield are hidden.

Wetmore (1926:121) describes fighting in the White-winged Coot (*Fulica leucoptera*) in Argentina which is like fighting of the American Coot, while Sclater and Hudson (1889:158) describe a similar alarm display in the White-winged Coot. The display of the Red-gartered Coot (*Fulica armillata*) attributed by Wetmore (1926:118) to mating, sounds much like paired display since it involved wing arching and the display of the white under tail coverts. He may, however, be describing the swimming arch.

This general use of conspicuous under tail coverts by the members of the genus *Fulica*, and perhaps also in the several genera of gallinules, is of interest. The question arises as to the value derived by the exhibition of under tail coverts in the Black Coot and Red-knobbed Coot (*Fulica cristata*) when those coverts are as dark as the rest of the bird (Dresser, 1903). Still, the Black Coot, at least, gives many of the same displays as the white-coverted American Coot. The South American species of *Fulica* all possess the white coverts with the black median area as in the American Coot (*cf.* Sharpe, 1894:209–225).

The displays of the Black Gallinule (*Gallinula chloropus*) seem to be remarkably similar to those of the American Coot. The platform activity of the Black Gallinule or Water-Hen as described and figured by Howard (1940:40) is identical with the arching of the American Coot. In fact, figures 1 and 2 of the plate facing page 40 (Howard, *op. cit.*) could as well refer to the American Coot as the Water-Hen, at least insofar as the posture is concerned. Howard (*op. cit.*) further describes bowing and nibbling in the gallinule similar to that occurring in the American Coot. Miller (1946:14) describes churning and swanning in the Black Gallinule which closely resembles the corresponding display of the coot (he calls it injury-feigning, but is probably incorrect in doing so). Fighting in the Black Gallinule, as described by Witherby *et al.* (1947:199), is like that of the coot. Pennock (*in* Bent, 1926: 347) describes wing arching and the exposing of conspicuous white tail

coverts in this gallinule, believing it to be courtship activity, and Morley (1936:121) describes Black Gallinules charging in a manner similar to that of an American Coot.

Other rallids possess coot-like displays to varying degrees. The Corn-Crake (*Crex crex*) erects its tail feathers in a fan-shaped manner in both courting and territorial displays (Witherby *et al.*, 1947:176) while the Water-Cock (*Gallicrex cinerea*) raises its tail when alarmed (Deignan, 1945:107), much as the coot does. In fact, the practice of raising the tail when alarmed seems to be general among the Rallidae. Deignan (*op. cit.*:110) also describes the use of white under tail coverts in the courtship display of the Blue Reed-Hen (*Porphyrio poliocephalus*). The Virginia Rail (*Rallus limicola*) runs around the vicinity of its disturbed nest "with drooping wings" (Walkinshaw, 1937: 473), thus resembling the swanning of the coot. Nibbling occurs in the Water-Rail, *Rallus aquaticus* (Witherby *et al.*, 1947:194).

Little comparison can be made between the calls of the various rails, especially as transcribed by a number of different persons. However, it is worth noting that the sexual dimorphism found in the voice of the American Coot is also known in both the Black Coot and Black Gallinule, and perhaps occurs in other species. Rüppell (1933) found a sexual difference in the voice and the syrinx in the Black Coot and noted a difference in the voices of the sexes in the Black Gallinule, but did not examine the syrinx of the latter species. Later, Grimeyer (1943) stated that the only reliable field differentiation between sexes in the Black Coot is based upon voice characters.

Injury-feigning.—The instinct that is so common among waterfowl and shore-birds to feign injury does not seem to exist in the coot. Not once in the several hundred times I have chased coots off nests or away from young have I seen any indication of injury-feigning. Nor have any references to this behavior in the genus *Fulica* been found in the literature. Perhaps this behavior is rare in the family Rallidae since the only unquestionable instances recorded are for the genus *Rallus*. Grinnell *et al.* (1918:287) and Kozicky and Schmidt (1949:359) report injury-feigning in the Clapper Rail (*Rallus longirostris*) and Witherby *et al.* (1947:194) report the same behavior in the closely related Water-Rail.

Summary and Conclusions

The strict territorialism exhibited by the American Coot is associated with an array of displays and calls. All anti-social displays have certain features in common, *i.e.*, the neck ruff and the prominent shield. These two features are supplemented by wing arching and the exposure of conspicuous white under tail coverts when more aggressive displays are required.

The response of other coots varies with their own internal state. If the

shield of an intruder is flat and its pugnacity at a low ebb, a call or at most a moderate display by the defending bird causes the intruder to retreat; if, however, the shield is swollen and the intruder is seeking territory, the defender uses the gamut of anti-social displays, even including actual combat, in its attempts to repulse the invader.

While each sex has a definite tonal quality to its calls, there seems to be a great deal of individual variation among birds of each sex. Certain of the notes seem fairly uniform throughout the population, *i.e.*, the alarm and growling notes, but the notes associated with normal activities vary from bird to bird, being similar only in sequence and mode of delivery.

The sexual difference that exists in the calls of adult coots makes it relatively easy to ascertain the sex of birds in the field. It is surprising that this difference in call notes of the American Coot has not been pointed out by earlier authors.

Acknowledgments

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Figure 2F is by Stephen A. Fenton and Al Jonez, of the Nevada Fish and Game Commission; all other figures are by the author (figs. 2A and 2B are reproduced from Kodachrome transparencies).

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NESTING BEHAVIOR OF A PURPLE-THROATED FRUIT-CROW

BY HAZEL R. ELLIS

On Barro Colorado Island, Panama Canal Zone, June 28, 1951, Eugene Eisenmann called my attention to a Purple-throated Fruit-crow (*Querula purpurata*) carrying nesting material. Since this interesting cotinga has received only casual attention in the literature, I devoted many hours from June 28 to July 16 in observing it.

The Purple-throated Fruit-crow is a conspicuous member of the sub-oscine family Cotingidae in the humid lowland forests. Its range is from Costa Rica through northern and Amazonian South America. The species is not one of the brilliantly colored representatives of the group but its persistent and melodious call notes, interspersed by harsh caws, announce its presence. Carriker (1910. *Ann. Carnegie Mus.*, 6:662) says: "They have a peculiar soft, liquid, musical note, very difficult to describe, which sounds a great deal like the cooing of a dove, only much sweeter and clearer." All records that I have examined mention this species as seen either singly or in small, noisy parties.

The common name, Purple-throated Fruit-crow, seems apt because the bird somewhat resembles a small Crow (*Corvus brachyrhynchos*). It is about ten inches long, is wholly black except for a gray bill and, in the male, a glossy, magenta throat-patch. Its manner of "catching" fruit doubtless accounts for a part of its name.

Stone (1928. *Proc. Acad. Nat. Sci. Philadelphia*, 80:169) reported that the natives called the Fruit-crow, "mae de Tucano," mother of the Toucan, on the theory that they always associate with the latter. He further wrote, however, that de Schauensee found this alleged constant association not to be the case although toucans and Fruit-crows were found together in some instances.

Fr. Haverschmidt has written me that the Indians of Dutch Guiana claim that the Fruit-crow nests in hollow trees. The pair of birds I observed built a shallow nest of branches and vines in the dense foliage of a tree[1] at the edge of an extension to the clearing made for a new laboratory building. The nest was at the junction of steeply ascending branches about 75 feet from the ground. Although the nest was well concealed from below by the dense foliage, from one position I could see that it was a shallow platform or saucer through which light could be seen. When the nest was completed it extended only

[1] From a comparison of leaves of this tree with herbarium specimens, it appeared to be *Cordia alliodora*. This is a common species in the tropical forests, but since flowers and fruits were not present and the tree was taller than the 40-60 feet reported for the species, it seems best to identify it only tentatively.

slightly beyond the body of the incubating bird. It was possible to see the head or tail of the bird when she was on the nest. I think that the nest was as well hidden from above as from below.

It is of interest to note that the bird was nesting during the rainy season, which corresponds with a report of the Penards (1910. "De Vogels van Guyana," Marinius Nijhoff, The Hague, 2:174) that the species breeds during the small rainy season in Surinam. According to Haverschmidt this period is from about February 15 to about April 15.

I began close observation at 9 a.m. on June 28. The pair made six trips to the nest in the next three hours. On four of the trips the male carried vines and twigs. The female always accompanied her mate and once I saw her fly to a perch with a twig and try to remove its leaves by passing the stem through her bill. She gave up her efforts and flew to the nest to arrange the material that the male had brought. Although the male brought much of the nesting material, the female appeared to do all of the construction and shaping of the nest.

During their cooperative nest-building activities one bird frequently uttered two or more soft *coos* that were answered by two or more harsh *caws* from its mate. The only evidence of courting that I saw was the male puffing out his throat-patch so that it projected laterally beyond the sides of the neck like a hummingbird's gorget. Mr. Eisenmann saw a male, presumably the same individual, do this in front of a female in a nearby tree on June 21, a week before the nest was found.

On June 29, the second day of my observations, the Fruit-crows showed greater activity. I observed eleven trips with nesting material in a four-hour period in the morning. Mornings seemed to be the time for work. The Fruit-crows often made extended trips away from the nest in the afternoon, returning for short visits. With the increased building activity, both birds carried in longer vines and twigs and once I saw the male get a piece of vine entangled in the branches of the nesting tree. He dropped it and then tried, but failed, to recover it before it reached the ground. Once both birds carried a vine about three feet long for a short distance. The female first appeared with the piece which was giving her some difficulty. The male flew to the dangling end and picked it up in mid-air and flew with it to within a few feet of the nest. He then dropped the end he was carrying and the female carried it to the nest.

On June 30, I observed the nest from 7:10 a.m. until noon. The pair made six trips to the nest but carried nesting material on only three trips. Apparently the nest was about completed and the egg-laying period was approaching. The birds were more vocal than they had been for two days and

they stayed in the area. The female spent a longer time on the nest when she entered it and occupied herself by shaping the nesting material.

The next two days the Fruit-crows stayed in the area and visited the nest less frequently. On two trips on July 2, I saw the male bringing in small pieces of nesting material. There was little courting and I never saw the birds taking food, although they visited the cecropia trees each day and worked among the branches.

I made no visits to the nest again until July 9. There was no activity after I arrived at mid-morning and I feared that the nest had been broken up by toucans or other predators, but I was mistaken. I heard the birds in the vicinity uttering the soft cooing that bespoke a harmonious existence. The next four mornings the birds were seen early near the nest. The female went to the nest and remained for a short time. After that they left and stayed away for a long period. Doubtless these four days comprised the egg-laying period but I was unable to determine the number of eggs in the clutch or to see an egg. I have found no reference in the literature to Fruit-crow eggs.

There was a change in behavior on July 14. The female was seen on the nest for several periods of thirty to fifty minutes each. She was still on the nest at 5:00 p.m. which was the latest in a day that I had observed. My judgment is that incubation began that day because the next morning the bird was on at 6:30 a.m., when I arrived, and remained for most of that day. The male was perched near and made short flights away from the area but I never saw him go to the nest.

I left Barro Colorado Island on July 16, and was not able to follow the fate of the Fruit-crow's nest.

I believe there were several pairs nesting on the island during my stay, for on one occasion I heard two pairs calling at the same time from different directions. Other times I encountered small groups of five or six. One wonders whether these small bands were family groups.

Birds that frequented the nesting area were sometimes tolerated and sometimes driven away if they came close to the nest. I never saw the Fruit-crows show great ferocity. The bird that excited them most was the Chestnut-mandibled Toucan (*Ramphastos swainsonii*).

I am indebted to Dean Amadon, American Museum of Natural History, and to Eugene Eisenmann for searching the literature on egg collections of neotropical birds. Fr. Haverschmidt and Alexander Skutch both shared with me their knowledge of *Querula purpurata*.

KEUKA COLLEGE, KEUKA PARK, NEW YORK, NOVEMBER 21, 1951

GENERAL NOTES

Birds seen on a trip to Labrador.—For three weeks in the autumn of 1950, I was a passenger on the Canadian National Railways ship, *S. S. Kyle*, as it made its last trip of the season to ports in Labrador. The *Kyle* left St. John's, Newfoundland, on October 14, and stopped at Newfoundland ports of Carbonear, Catalina, Wesleyville, Twillingate, and St. Anthony. We then sailed north, passing west of Belle Isle, to reach the Labrador coast at Battle Harbour. Numerous small ports as far north as Hopedale were visited. On the return trip, we sailed up Lake Melville to call at Northwest River and Goose Bay before returning to the Atlantic Ocean and going south. As a rule, the *Kyle* moved close to shore, usually within several hundred yards of land, and went especially close to land when entering the many small harbors in Labrador or when threading its way among the numerous rocky islands and shoals which lie off the coast of Labrador. However, we were several miles from land when crossing Conception Bay, Trinity Bay, Bonavista Bay, Notre Dame Bay, the open sea east of the Grey Islands, the strait of Belle Isle, and Hamilton Inlet. The wind was generally moderate to strong; it blew from the west or northwest except for a severe easterly gale on two days (Oct. 21 and 22). Daytime air temperatures were 30-40° F. in Newfoundland waters and 20-30° on the Labrador coast. There was snow on the ground after the first day in Labrador.

I devoted about five hours a day to observing the birds of the region. Except for the stop at Cartwright, Labrador, I made my observations from the ship since it was usually difficult or impossible to go ashore. Seven-power (7×50) binoculars were used in scanning the water and shore. I have summarized the results in Table 1. Exact determination of species was not always possible for a variety of reasons, including poor light, distance, snow flurries, and rough water. The larger and rounded-off numbers in Table 1 are, of course, mostly estimated values.

Nearly all of the Fulmars (*Fulmarus glacialis*) seen were within a few miles of Hawke Harbour, Labrador, the site of a whaling factory. They were especially numerous in Hawke Harbour itself. I saw over a hundred there on each of two occasions, some on the water but most in flight about the harbor.

The unidentified ducks were nearly all female eiders; exceptions were the ducks seen on Lake Melville, 12 on Oct. 26 (probably White-winged Scoters [*Melanitta fusca*], according to a missioner at Northwest River) and 80 on Oct. 30 (apparently Goldeneyes [*Glaucionetta clangula* or *G. islandica*] but very far distant). I saw no Black Ducks (*Anas rubripes*), Old-squaws (*Clangula hyemalis*), Harlequin Ducks (*Histrionicus histrionicus*), Surf Scoters (*Melanitta perspicillata*), or Red-breasted Mergansers (*Mergus serrator*). They might reasonably have been expected since they all appear to breed in Labrador and the recorded late dates of their departure are close to the time that I was in the region (Austin, 1932. *Mem. Nuttall Ornith. Club*, No. 7: 40-61; Bent, 1923. *U. S. Natl. Mus. Bull.* 126:1-68; 1925. *Ibid.* 130:1-151).

I saw no Gyrfalcons (*Falco rusticolus*) although I was informed by a resident of southern Labrador that Gyrfalcons become fairly common there in December and that many are killed in pole traps in winter. I saw only one Duck Hawk (*Falco peregrinus*). It flew shorewards across our bows when we were several miles off the Grey Islands. This bird was probably a migrant from Labrador where it is a common summer resident (Austin, *op. cit.*: 69). Peters and Burleigh (1951. "The birds of Newfoundland," Hough-

TABLE 1

BIRD COUNTS IN NEWFOUNDLAND AND LABRADOR WATERS

SPECIES	DATE																	
	Oct. 14	Oct. 15	Oct. 16	Oct. 17	Oct. 18	Oct. 19	Oct. 20	Oct. 21	Oct. 22	Oct. 23	Oct. 24	Oct. 25	Oct. 26	Oct. 30	Oct. 31	Nov. 1	Nov. 2	Nov. 3
Unidentified loons (*Gavia* sp.)				1	1													
Fulmar (*Fulmarus glacialis*)			1		500	75										49	250	47
Wilson's Petrel (*Oceanites oceanicus*)	1	1																
Gannet (*Moris bassanus*)		27																
Canada Goose (*Branta canadensis*)							8											
Common Eider (*Somateria mollissima*)						180		3		1400	2000	2				6	500	
King Eider (*Somateria spectabilis*)			30			15	50			1							1	
White-winged Scoter (*Melanitta fusca*)								1										
Unidentified ducks						750	65		4	300	200	6	12	80		80	330	50
Duck Hawk (*Falco peregrinus*)			1															
White-rumped Sandpiper (*Erolia fuscicollis*)		1			4	1	125								1		2	9
Sanderling (*Crocethia alba*)				1														
Unidentified small shore-birds		1	1	10	1	1						3				3		2
Glaucous Gull (*Larus hyperboreus*)																1	1	

Iceland Gull (*Larus leucopterus*)			4	12	8	14	4		2	8	20	26	20	25	3	14	200	20
Great Black-backed Gull (*Larus marinus*)	20	40	1	12	23	29	9	8	8	11	75	8		4	5	20	9	13
Herring Gull (*Larus argentatus*)	30	40	27	140	140	120	110	25	30	90	75	90	125	100	20	65	160	15
Kittiwake (*Rissa tridactyla*)		200	23	5	1	20	30	1		31	150	8			5	2	4	31
Razor-billed Auk (*Alca torda*)						3									1	1	2	5
Atlantic Murre (*Uria aalge*)															2	1	2	20
Brünnich's Murre (*Uria lomvia*)							1			1		1			5	3	12	135
Dovekie (*Plautus alle*)	1	4	280	35	110	1000	90	10	10	300		25			100	210	360	140
Black Guillemot (*Cepphus grylle*)				7		28	3	1	1	12	200	11			30	26	7	1
Atlantic Puffin (*Fratercula arctica*)																	1	2
Unidentified alcids			7			1	2			1		3			3	7	10	23
Snowy Owl (*Nyctea scandiaca*)																1		
Raven (*Corvus corax*)				6	1	7	1			1		2			2	8	13	
Snow Bunting (*Plectrophenax nivalis*)			3	40	6	1	80											

Localities visited during daily periods of observation.—Oct. 14, St. John's to Carbonear. Oct. 15, Catalina to Cape Freels. Oct. 16, the Grey Islands to Belle Isle. Oct. 17, Battle Harbour to Francis Harbour. Oct. 18, Francis Harbour to Comfort Bight. Oct. 19, Comfort Bight to Cartwright. Oct. 20, Cartwright to Run-by-Guess Island. Oct. 21–22, anchored at Run-by-Guess Island while a strong gale blew from the east. Oct. 23, Run-by-Guess Island to Maccovik. Oct. 24, Turnavik to Hopedale and back to Turnavik. Oct. 25, Holton Harbour to Emily Harbour, back to Holton Harbour and returning to Emily Harbour. Oct. 26, Northwest River to Goose Bay. Oct. 27, 28, 29, anchored at Goose Bay; only Iceland and Herring Gulls were seen, in about same numbers as on Oct. 26. It was not possible to go ashore. Oct. 30, Goose Bay to Rigolet. Oct. 31, Indian Tickle to Rocky Bay. Nov. 1, Spotted Island to Comfort Bight. Nov. 2, Comfort Bight to Williams Harbour. Nov. 3, Battle Harbour to St. Anthony.

ton Mifflin Co., Boston, p. 146) describe the Duck Hawk as a rare summer resident and transient in Newfoundland. They give only four records of this species.

The late occurrence of shore-birds in Labrador was interesting. These birds were apparently not merely stragglers since I saw 115 White-rumped Sandpipers (*Erolia fuscicollis*) in a walk along a two-mile stretch of the rocky beach at Cartwright on Oct. 20; the water was then thinly frozen over in the shallow places. It is apparent from Table 1 that the migration of White-rumped Sandpipers from Labrador was still taking place in November. Bent (1927. *U. S. Natl. Mus. Bull.* 142:192) gives the late date of this species at Battle Harbour as Oct. 29. Austin (*op. cit.*: 98) states that scattered individuals linger on in Labrador through October although most birds have passed through by the end of September. Hantzsch (quoted by Austin, *loc. cit.*) observed a White-rumped Sandpiper at Hopedale on Nov. 2, 1906. I found both White-rumped Sandpipers and Sanderlings (*Crocethia alba*) to be rather common on Nov. 10, 1950 at Searston in southwestern Newfoundland. Peters and Burleigh (*op. cit.*:199) give Nov. 22 as the late date for White-rumped Sandpipers at St. Anthony. They also give (*op. cit.*: 209) Oct. 1 as the late date for Sanderlings in Newfoundland. I saw no Purple Sandpipers (*Erolia maritima*) on the trip although we passed much apparently ideal habitat. Since the winter range of Purple Sandpipers extends as far north as Greenland (Austin, *op. cit.*: 95; Bent, 1927:151), it might be presumed that relatively few migrants of this species had reached Labrador and Newfoundland by Nov. 3. Peters and Burleigh (*op. cit.*: 197) described the Purple Sandpiper as an uncommon winter resident and transient in Newfoundland. The unidentified small shore-birds I saw were neither Purple Sandpipers nor White-rumped Sandpipers; they appeared to be other species of the genus *Erolia*.

The scarcity of Glaucous Gulls (*Larus hyperboreus*) was somewhat surprising. Coues (quoted by Austin, *op. cit.*: 111), who spent July and August, 1860, on the coast of southern Labrador, thought Glaucous Gulls were rather rare in this region. Others (cited by Austin, *loc. cit.*) reported them common throughout the interior and north of Cape Harrison. Austin says that Glaucous Gulls are most common between Hamilton Inlet and Nachvak but are never so common as Herring Gulls (*Larus argentatus*) and Great Black-backed Gulls (*Larus marinus*). It should be kept in mind that these reports were made by persons present in Labrador only during the summer months. Peters and Burleigh (*op. cit.*: 221) state that Glaucous Gulls are fairly common winter residents in Newfoundland, becoming most common in fall, winter, and spring when drift ice is just offshore. Austin gives only one record of an Iceland Gull (*Larus leucopterus*) for Labrador. As he remarked, this is doubtless due to the absence of observers during the autumn, winter, and spring months, when this species would be expected. Peters and Burleigh (*op. cit.*: 223) describe the Iceland Gull as an uncommon winter visitant in Newfoundland. I found that the white-winged gulls in Labrador always occurred with Herring Gulls and, in salt water, with Great Black-backed Gulls also. Because of this, I was able to estimate comparative wing-spread and relative heaviness of bills, critical field marks for the separation of Glaucous Gulls from Iceland Gulls. On the basis of these observations, the species identifications of Table 1 were assigned. It will be noted that the only white-winged gulls seen on Lake Melville and Goose Bay were apparently Iceland Gulls and that only two Glaucous Gulls were seen on the coast of Labrador.

A man living near Hawke Harbour told me that Glaucous Gulls (apparently known locally as "slob gulls") do not become common there until December, when ice is forming in large amounts in the ocean. Since he seemed to have observed wild life closely and

with interest, I felt that his statements were accurate. I also gathered from his remarks that Ivory Gulls ("ice partridges"; *Pagophila eburnea*) are seen at Hawke Harbour with the appearance of sea-ice in December.

The difference in habitat of the various alcids was rather sharply marked. Black Guillemots (*Cepphus grylle*) were seen in the sheltered harbors and close to shore, Dovekies (*Plautus alle*) in deeper and less sheltered waters and the Murres (*Uria aalge* and *U. lomvia*) and Razor-billed Auks (*Alca torda*) in still deeper water and further from shore. Puffins (*Fratercula arctica*) were either uncommon in Labrador at the time or else prefer regions further from shore than the *Kyle* ordinarily sailed, for I saw very few of these birds. Austin (*op. cit.*: 140) remarks that Puffins stay among the outer islands and almost never come into the bays, at least during summer, the time of his observations.

The migration of Snow Buntings (*Plectrophenax nivalis*) from Labrador was apparently complete after the fourth week in October, since I saw none of these birds after Oct. 20. According to Austin (*op. cit.*: 200), they are rarely found in Labrador during the winter. —JOHN G. ERICKSON, *611 North Lilac Drive, Minneapolis 22, Minnesota, September 18, 1951.*

Closely associated nests of Bronzed Grackle and English Sparrow.—The Bronzed Grackle (*Quiscalus quiscula*) has been considered to be an enemy of nesting birds, destroying both the eggs and the young. Specifically, it has been recorded as killing and partly eating English Sparrows (*Passer domesticus*) (Forbush, 1929, "Birds of Mass. etc., Part 2," pp. 458–459). The English Sparrow is said to rob and kill many native birds, and destroy their nests, eggs, and young. Allegedly, sparrows have driven all the smaller hole-nesting birds from cities and villages, and many that nested among the branches of trees. Supposedly sparrows kill birds as large as the Robin (*Turdus migratorius*) or Flicker (*Colaptes auratus*) by attacking in numbers or follow native birds about until the latter leave the neighborhood (Forbush, *op. cit.*, Part 3:42).

This reported mutual antipathy makes it advisable to record an example of extreme tolerance. In a trumpet vine on our garage in Chesterton, Indiana, in 1948, an English Sparrow had its bulky, untidy, domed nest but a short distance below the eaves. In April, a grackle used this nest for the foundation of its own nest. When the nests were examined on May 8, each contained young. On May 16, when still poorly fledged, the first young grackle climbed out of the nest, along interlacing twigs and branches, and away into the trees. The last one left the nest on May 19. The young sparrows left the nest on May 20 and climbed and fluttered into the neighboring trees.

While the adult grackles appeared oblivious to the sparrows, the sparrows sometimes appeared perturbed when a grackle visited its nest, and waited until the grackle had left before going to their nest. Sometimes when a grackle flew to its nest when the sparrow was at its nest directly below, the sparrow flew out. But this was not always true, and sometimes the sparrow, at its nest entrance, would simply look up at the grackle arriving just above it.

Often on their way to or from their nests, both adult sparrows and grackles perched close together in a nearby elm tree and completely ignored each other.

This is a case of two species, each ordinarily thought of as antagonistic to other nesting birds, raising their young in nests in close proximity. The grackles apparently built on top of the sparrows' nest because it offered a suitable, solid foundation. The total lack of interest of each species in the young of the other was striking and surprising.

The close nesting of two aggressive predatory species, however, or of a predator and a

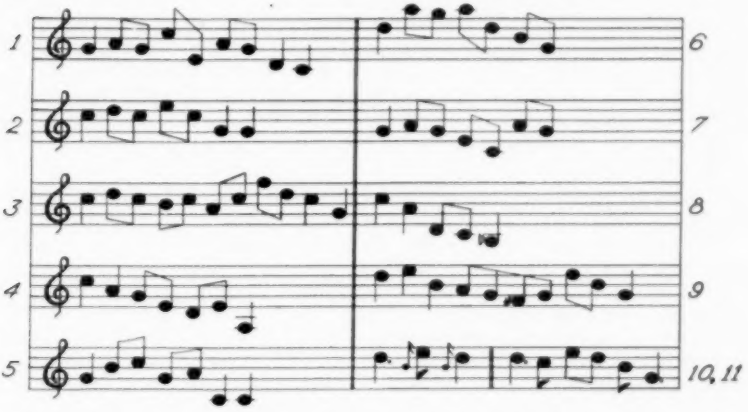
weaker or a prey species is not uncommon, indicating that about nests there is sometimes a change in interspecific intolerance. Bent (1938. *U. S. Natl. Mus. Bull.*, 170:22) quotes Decker and Bowles as reporting Ravens (*Corvus corax*) and Prairie Falcons (*Falco mexicanus*) nesting on the same cliff without discord. Murphy (1936. "Oceanic Birds of South America, Vol. 2, p. 933) notes that boobies (*Sula*) and man-o-war-birds (*Fregata*) nesting a meter or two apart pay less attention to each other than either does to members of its own species. The change in behavior when the boobies are returning to the nesting grounds well laden with fish is most extraordinary, for then apparently the man-o-war-birds rob the boobies. Barnacle Geese (*Branta leucopsis*) have been recorded nesting undisturbed close to a Gyrfalcon's (*Falco rusticolus*) nest (Bent, *op. cit.*:4).

Nests of English Sparrows, Starlings (*Sturnus vulgaris*), or grackles are commonly built in convenient niches among the sticks of Osprey's (*Pandion haliaetus*) bulky nests, and even House Wrens (*Troglodytes aëdon*) and the possibly competing Black-crowned Night Herons (*Nycticorax nycticorax*) have been admitted by Ospreys as "basement tenants" (Bent, 1937. *U. S. Natl. Mus. Bull.*, 167:370–371).

Other examples of a less aggressive species nesting near a more aggressive species, in India, have been given by Major General Hutson (1947. *Ibis*, 89:569–576). Durango (1949. *Ibis*, 91:140–143) has reviewed at some length the nesting associations of birds of different species with many additional examples, especially from Europe. In his opinion several factors which often reinforce one another may be involved as follows: (1) Similar or identical habitat preferences; (2) The nest of one species is a suitable nesting site for another; (3) Food available in nests or territories of certain species encourages other specialized feeders to nest there; (4) Sociability; (5) Protection afforded by the more aggressive species. Factor 2 seems to have been the important one in the grackle-sparrow instance. Durango also points out that some birds of prey appear to avoid disturbances in the vicinity of their own nest, a point that Brewster (1937. "Concord River," p. 177) after noting a Blue Jay (*Cyanocitta cristata*), Robin (*Turdus migratorius*), and Red-eyed Vireo (*Vireo olivaceus*) in fairly close proximity, wrote as follows: "I begin to believe that there is some truth in the statement (made originally by I know not whom) that predaceous animals seek their victims at some distance from their own homes."—A. L. AND R. M. RAND, *Chicago Natural History Museum, February 17, 1950.*

Songs of the Western Meadowlark.—To those fortunate folk who have lived in almost daily association with the Western Meadowlark (*Sturnella neglecta*) there are several matters regarding its song that become pretty well established. In addition to its incomparable joyousness one will soon recognize a certain format to each performance, *i.e.*, it is a form song. Unlike the song of many birds, the Meadowlark's station song (but not its soaring song) is one that is commonly repeated as exactly as though it were a phonographic recording (unhappy simile). To be sure there may be quite an album of discs and I have closely watched a single performer change to a new disc without clatter or prolonged delay, still each recording seems to be pretty sharply cut upon the wax of his psychic complex. Individual birds certainly have their favorite "arias" which are rendered often enough to characterize the singer and his territorial stage setting. Furthermore, I have not actually traced more than three discs to a single performer though color banding might extend this number appreciably. Within the combined territories of a number of individuals, however, the variety becomes quite extensive.

Another fact that soon becomes evident to the "bird listener" is the impossibility of

transcribing the song in the clumsy medium of musical notation. Like a violin virtuoso, he does things that set the five line staff completely at a loss. Nor is it necessary that he conform to a man-made sequence of whole and half tones which our system of musical notation is designed to express (not all peoples' do). Still, there may be recognized in some of the bird's performances a sequence of intervals that do fairly closely conform. With a degree of compression and resultant distortion, the fundamental structure of the song may be noted on the musical staff. The result is a mere "black and white still" of a rainbow-colored fountain of sound that defies capture and imprisonment, but the record does aid the memory and perhaps it will extend our appreciation of its variety.

One spring my class in biology had a goodly sprinkling of music majors among its members. The project of notation of Meadowlark songs was therefore undertaken as a scheme for "correlation of subjects" in the curriculum. One of my colleagues has strongly urged that some of the results of this effort be made public. Hence the following notes are offered. Observations were made during the spring semester and were restricted to an area of approximately forty acres in a newly annexed district of level land within the city of Los Angeles. Open fields and native vegetation were but slightly modified—just enough to supply ideal "singing posts" for an abundant Meadowlark population. Nine distinct "melodies" were noted (see figure).

On two occasions during my own contacts with the species I have heard perfect melodic sequences that suffered no distortion when spread upon the musical staff. In both cases there was extreme simplification through reduction of grace notes and glides. They are recorded in Nos. 10 and 11 of the figure. Both were delivered at the height of the breeding season and were therefore presumably birds of at least one year's age. One of the records is the simplest Meadowlark song that has come into my experience.—LOYE MILLER, *University of California, Berkeley, May 13, 1951.*

The song of the Alder Flycatcher.—I have known the Alder Flycatcher (*Empidonax traillii traillii*) for many years—since 1885, when I called it Traill's Flycatcher, to be exact—and I have heard its song as recently as this summer of 1951. I was much interested in Mr. McCabe's description of its flight song in *The Wilson Bulletin* (1951,

63:89–98)—something I have never been so fortunate as to hear. I was also interested in his discussion of the regular song, and, not being acquainted with it as it is given by Midwestern birds, I have no reason to disbelieve in his main thesis as to the difference between Eastern and Midwestern singers. My observations have been confined to the East—Massachusetts, Vermont, New Hampshire, Maine, New Brunswick, Nova Scotia, and Quebec Labrador—but I think I am in a position to criticize McCabe's table of phonetic expressions of the song because I have paid particular attention to the syllabification of birds' songs since 1895. In that year my journal recorded that hitherto I had been content with William Brewster's *ké-wing* (perhaps learned in conversation with Mr. Brewster), but on hearing the song near at hand in June at Londonderry, Vt., I found Dr. Dwight's rendering in Chapman's "Handbook of Birds . . ." very nearly exact, though I amended it to *wee-zeé-up* with the *up* very faint. I recorded this in *The Auk* (1902. 19:84–85). I also summarized this note in a communication to Bent's "Life Histories" (1942. *U. S. Natl. Mus. Bull.* 179:210). In McCabe's search for published "phonetic expressions," which was by no means exhaustive, it is not strange that this note of mine should have been overlooked. I mention it here only because I think it important to note that the final so-called syllable is faintly uttered.

This leads me to ask just what constitutes a syllable in a bird's song. In studying McCabe's table I could not help thinking that the difference between his three-syllable and two-syllable songs was sometimes a mere matter of the use of a hyphen by the human recorder. As an example, there is Saunders' *tick-weeah*, which McCabe calls a two-syllable song, though if the describer had happened to insert a hyphen after the *ee*—where one would really have expected to find one, *weeah* not constituting a normal syllable in the English language—he would have placed it in the three-syllable category. It seems to me that these so-called third syllables of this bird's song are really only downward inflections in the second syllables. In almost every case quoted this so-called syllable begins with a vowel, without the sharp break that would be indicated by a consonant, such as we hear in the *chick-a-dee-dee* of *Parus atricapillus*.

I am convinced that as most of us hear the Alder Flycatcher's song it is largely a matter of distance how we render it. On the island of Cape Breton, N. S., in the summer of 1951 I heard this song many times. It seemed to be always a two-syllable song, but it was too far away and in a place too difficult of access for me to hear it distinctly, and I feel pretty sure that if I had been nearer, I should have heard that downward inflection that some have called a third syllable.

Another element enters into the situation. In all syllabifications of birds' songs the personal equation enters, and McCabe sums this up very well in the first paragraph of his Summary. It has always seemed to me that some syllabifiers are too prone to rest content with what strikes them at first as a fairly good rendering, and do not listen again and again to the song to make sure they cannot improve upon it. This was my own case in my earlier years of observation. As a matter of fact, of course, birds do not sing in human syllables. Their consonants do not begin or end what we call syllables. When they exist at all, they run all the way through them. Nevertheless, this syllabification is an important adjunct to our descriptions of certain songs. Our attempts at imitation of the originals will assist our own memories and may often help other observers.

Unfortunately there is a rather disturbing number of inaccuracies in McCabe's table of "Phonetic Expressions." Some of these are in the localities named, where he seems to have assumed that the place of publication or the residence of the authority was the locality of observation. In other cases he has failed to go back to the original record, and

in still other cases no explanation is evident. I am not sure that I have caught them all, but such as I have detected with the help of my own small library I must note here. The authority for *ee-zee-e-ăp* is really Dwight in Chapman's "Handbook of Birds . . ." (1895 and later editions) and the locality must have been New York or New England or both, not Washington, D. C. The Minot reference should be to H. D. Minot's "Land-Birds and Game-Birds of New England" (1876, Salem, Mass., and second edition edited by Brewster, 1895, Houghton, Mifflin & Co., Boston and New York), with New England for locality. Widmann's locality was presumably Missouri, where he lived, instead of Indiana. The *greadeal* of Miller should be *grea'deal* (with the apostrophe), and his original publication of it was in *The Auk* (1903, 20:68), where he says he adopted it from P. B. Peabody, who lived in Minnesota, while Miller himself lived in New Jersey. Silloway's post of observation at the time seems to have been Illinois, not Massachusetts. Saunders' locality must have included New England as well as New York. Hoffmann's name is misspelled, and his locality was New England, where he lived, as well as New York. Bent lives in Massachusetts, but his ornithological work has not been confined to that state.

I am sorry to have to call attention to these minor errors. I leave it to readers of McCabe's paper to consider how seriously they affect his general conclusions if at all. To my mind they are of little importance in comparison with my more fundamental criticism of this part of his paper, but their occurrence in what seems to be an important contribution to ornithology needs notice as a warning to readers—and also as a warning to other workers in the vineyard!

To close these comments on an affirmative note, I should like to call attention to the renderings of the song by the describer of the subspecies *E. t. alnorum*, and author of the present vernacular name, William Brewster, in his posthumous "Birds of the Lake Umbagog Region of Maine," (1937, *Bull. Mus. Comp. Zool.*, 66 (pt. 3):496). Here we have *quee-quee* and *quee-queer*, and it should be remembered that Brewster was a New-Englander to whom the final *r* would be silent, contributing only the falling inflection to that second syllable. This might take the place of the *ké-wing* attributed to Brewster earlier in this note. And it is interesting that these records of Brewster's were made in the type locality of the subspecies that may have to be restored to the Check-List. —Francis H. Allen, *9 Francis Ave., Cambridge 38, Massachusetts, October 22, 1951.*

Swainson's Warbler in Prospect Park, Kings County, New York.—In recent years Swainson's Warbler (*Limnothlypis swainsonii*) has been recorded as breeding in Maryland (Stewart and Robbins, 1947, *Auk*, 64:272), Delaware (Meanley, 1950, *Wilson Bulletin*, 62:93–94), and West Virginia (Brooks and Legg, 1942, *Auk*, 59:76–86). As with many other species, the extension of a breeding range is frequently concurrent with casual observations in areas where the bird has never before appeared. I wish to report the bird from southeastern New York.

On May 5, 1950, during a drizzling rain, Geoffrey Carleton discovered a Swainson's Warbler on the muddy margin of a small pond in Prospect Park, Brooklyn. Knowing that it was an unusual species, he watched it for some time. In its search for food it turned up dead leaves in the manner of a Rusty Blackbird (*Euphagus carolinus*). Carleton telephoned Dr. W. T. Helmuth 3rd, who rushed to the scene and observed the interesting bird from about 6:30 p.m. until dark. The warbler infrequently gave a thin, sweet *tsip* but it did not sing.

The following morning several observers carefully searched for the bird in the immediate vicinity of the pond. Eventually, Robert Grant and I relocated it about 500 yards

away, at the base of a bushy slope. To us its behavior seemed like that of a Worm-eating Warbler (*Helmitheros vermivorus*) as it investigated the leaves, twigs, and other debris beneath the thick brush. We had a chance to observe it for about fifteen minutes when a passing truck frightened it into flight. No one could find it again.

The weather on May 5 and 6 was mild and rainy. On the 6th there was considerable fog. Weather reports described winds of hurricane force in the Midwest on May 5. The area affected by a large cyclonic low the night before included southern Indiana and West Virginia, a part of the northern edge of the Swainson's Warbler's breeding range. —Irwin M. Alperin, *Linnaean Society of New York, 2845 Ocean Avenue, Brooklyn 35, New York, January 1, 1951.*

Clay-colored Sparrow in Massachusetts.—The Clay-colored Sparrow (*Spizella pallida*) was added to the list of birds known from Massachusetts when two specimens were collected by Oliver L. Austin, Jr., on September 20, 1930. Since that time, two more Clay-colored Sparrows have been collected and twelve have been banded. All of these records are listed below. Eleven sight records, from 1940 to 1951, have not been included below because the difficulty of identifying fall Clay-colored Sparrows makes sight records unreliable. These sight records were published in *Records of New England Birds.* I am indebted to Oliver L. Austin, Jr., Dorothy E. Snyder, Curator of Natural History at the Peabody Museum, Salem, Massachusetts, and Aaron M. Bagg for their help in gathering the records presented here.

Specimens

September 20, 1930. Two adult males collected by Oliver L. Austin, Jr. (1931. *Auk*, 48:126–127), at North Eastham. Specimens now Nos. 17837 and 17838 in the Boston Museum of Science. Identification checked in 1951, by James L. Peters, Museum of Comparative Zoology, Cambridge, Massachusetts.

March 24, 1950. An immature, sex unknown, was taken by James Baird at Amherst. The bird was first observed at Amherst by Robert Smart at his feeder on January 17, 1950. The identification was confirmed by J. L. Peters. It is now No. 231 in the collection of the University of Massachusetts at Amherst.

September 20, 1950. One immature male taken by Oscar M. Root at North Andover. The specimen, identified by J. L. Peters, is now in the Peabody Museum, Salem.

Birds banded

The first 11 of the following 12 birds listed were banded at the Austin Ornithological Research Station, North Eastham.

October 11, 1930. One adult, C80003, by O. L. Austin, Jr. Repeated October 11 and 12 (twice), 1930 (Austin, *loc. cit.*).

November 3, 1930. One immature, C80542, by O. L. Austin, Jr. Repeated November 3, 4, and 5, 1930 (Austin, *loc. cit.*).

September 29, 1934. One immature, L64783, by O. L. Austin, Jr. and Seth H. Low. Repeated October 3, 4, 5, 7, 8, 10, 13, 14, 15, and 16, 1934.

October 3, 1934. One adult, L64913, by O. L. Austin, Jr. and S. H. Low. Repeated October 4, 5, 7, and 8, 1934.

October 3, 1934. One immature, L64918, by S. H. Low. Repeated October 3 and 4, 1934.

October 17, 1934. One adult, 34-81301, by S. H. Low. Repeated October 17, 1934.

October 19, 1936. One, 37-24055, by L. J. Brewer. Repeated October 21, 1936.

October 20, 1936. One, 37-24059, by L. J. Brewer.

October 18, 1940. One, 239-6821, by L. J. Brewer. Repeated October 23, 24, and November 19, 1940.

September 20, 1941. Two, 140-20987 and 140-20992, by L. J. Brewer.

November 21, 1940. One immature, 139-56997, by George J. Wallace, at Lenox.

The Clay-colored Sparrow has been known to be a summer resident in southern Ontario since 1924. In 1950, it was found breeding there by T. Swift, D. Scovell, and D. West (Baillie, James L., 1950. *Audubon Field Notes*, 4:274). Perhaps the birds recorded in Massachusetts in fall are migrants or wanderers from the southern Ontario population. Because of the difficulty of identifying the Clay-colored Sparrow in fall plumage in the field, it may be more regular in autumn in Massachusetts than the records given above would indicate.—OSCAR M. ROOT, *Brooks School, North Andover, Massachusetts, March 15, 1952.*

Notes on nesting Traill's Flycatcher in eastern Arkansas.—During the summer of 1951 I had the opportunity to observe the nesting of Traill's Flycatcher (*Empidonax traillii*) in the Grand Prairie region of central-eastern Arkansas. It may be recalled that it was along the prairies of the Arkansas River that Aubudon collected the type specimen of Traill's Flycatcher (see discussion by Aldrich, 1951. *Wilson Bulletin*, 63:193–194); in fact the type specimen was actually taken at the Fort of Arkansas on April 17, 1822 (Arthur, 1937. "Audubon: An Intimate Life of the American Woodsman," p. 251). The Fort of Arkansas, located about 50 miles south of Stuttgart, was better known in Audubon's time as it is today, as Arkansas Post, and was the territorial capital of the state at the time of Audubon's first visit there. Audubon reported in his "Ornithological Biography" (Edinburg, 1831:236) that although he was unable to discover the nest in that area, he suspected that the species nested there. A female collected by him contained five eggs "about the size of green pease" in the ovary. While it does seem unusual that the species would be nesting as early as April in this area, in early summer it is a common breeding bird wherever suitable habitat occurs on the prairie.

Arthur H. Howell (1911. *U. S. Biol. Surv. Bull.* 38:54), collecting near Stuttgart in May, 1910, found Traill's Flycatcher "fairly common, living in orchards, dooryards, and about small clumps of trees on the prairie."

The northern boundary of the Grand Prairie is somewhat tangent to a line drawn from Memphis, Tennessee, to Little Rock, Arkansas, while its southern boundary borders the Arkansas River. It is the major rice producing area of the state, with the city of Stuttgart in its center. Ecologically it is a true prairie land and was the home of the Prairie Chicken (*Tympanuchus cupido*) before the introduction of rice in the early 1900's.

Traill's Flycatchers observed by Howell were probably representative of the local breeding population; however, the first definite evidence of breeding from this area is based on the writer's record of two fledglings just out of the nest and being fed by a parent bird on July 18, 1951. Other nesting records from the state are reported by Baerg (1951. "Birds of Arkansas," *Univ. Arkansas Coll. Agric. Bull.* 258:98–99).

Traill's Flycatcher nests mainly in two habitat types on the Grand Prairie: (1) slashy thickets bordering drainage areas, and (2) "islands" of scrub vegetation, usually small trees, out on the prairie. The area selected for nesting studies in 1951 was an 18-acre thicket of haw (*Crataegus*) and persimmon (*Diospyros virginiana*) with openings, all surrounded by rice and lespedeza fields.

I saw the first pair of summer resident Traill's Flycatchers in the study area on May 10, on which date they had already established territory. By June 1, 17 pairs had established territories on the 18-acre tract of thickets. On May 28, I found three nests ready for eggs, and on May 31, one of these three nests held two eggs. In all, I found 15 nests in the territories of nine pairs of flycatchers. This indicates that individual pairs of Traill's Flycatchers in this study area were either renesting or attempting to raise a second brood in a new nest after successfully completing the first hatch. In one individual territory this second or later constructed nest was only 23 feet from the first nest. The average clutch for the 15 nests was 3.0 eggs, and the maximum number of eggs found in any nest was 4. The average number of young fledged per nest was 2.2, and at least one bird was fledged from each of 11 nests.

The locations of the 15 nests were as follows: 13 in haw trees, 1 in a persimmon, and 1 in a dogwood (*Cornus*). The "Yellow Warbler (*Dendroica petechia*) type" of nest was placed at an average of 7.5 feet from the ground. Fifteen of the 17 territories were located on the edge of the study area (18-acre tract of thickets), ten nests being on its western side. The nests of three pairs, each on individual territories, were located in a single acre of the 18-acre study area. Two pairs of young still in the "stub-tail" stage were noted near their nests on August 10.—Brooke Meanley, *U. S. Fish and Wildlife Service, Stuttgart, Arkansas, October 15, 1951.*

Notes on Mexican bird distribution.—A comparison of the data contained in a "Distributional Check-List of the Birds of Mexico" (Friedmann, Griscom, and Moore, 1950. *Pacific Coast Avifauna*, No. 29, Part 1), with my field notes on Mexican birds revealed that some of my observations extend the known ranges, as given in the Avifauna.

I submitted a list of probable species range extensions to Mr. L. Irby Davis for review. He informed me that most of the ranges, though unpublished, have been known for some time to many persons studying Mexican birds, but that four of the records (Wood Duck, Whooping Crane, Bonaparte Gull, and Black-billed Cuckoo) should be of interest to many field workers. These four records probably are the major contributions among the following data

Black-bellied Tree Duck (*Dendrocygna autumnalis*). —Six were flying up the Río Naranjo at El Salto, San Luis Potosí, early on the morning of February 25, 1951. They returned downstream about one hour later. The elevation here is about 1500 feet above sea level. On March 5, 1951, one was standing beside a small reservoir in southern Coahuila along the railroad between Saltillo in Coahuila and Avalos in Zacatecas.

Green-winged Teal (*Anas crecca*).—One pair on the Río Naranjo, downstream from El Salto, San Luis Potosí, at an elevation of about 1300 feet, February 24, 1951.

Wood Duck (*Aix sponsa*).—One female was on a roadside pond 73 miles southwest of Matamoras, Tamaulipas, along the highway to Victoria, February 23, 1951.

Canvasback (*Aythya valisineria*).—On March 6, 1951, one was flying over an ore mill tailing dump which contained water at Terminal, northern Zacatecas. Local hunters stated that Canvasbacks were sometimes shot during the hunting season in this area, although the Green-winged Teal was the most common duck.

Black Vulture (*Coragyps atratus*).—In Hidalgo, north of Jacala, one was found at an elevation of about 5000 feet, February 28, 1951; in Chihuahua, there were several between Hidalgo Parral and Chihuahua, March 9, 1951.

Gray Hawk (*Buteo nitidus*).—One northeast of Saltillo, at Ramos Arizpe, Coahuila, March 4, 1951.

Harris Hawk (*Parabuteo unicinctus*).—On February 24, 1951, one at El Salto, on the Río Naranjo, San Luis Potosí. On March 9, 1951, one between Jiménez and Chihuahua, Chihuahua.

Caracara (*Caracara cheriway*).—Three south of Saltillo, southern Coahuila, March 5, 1951, and one about 15 miles south of Hidalgo Parral, Chihuahua, March 9, 1951.

Peregrine Falcon (*Falco peregrinus*).—We watched one, of two, obtain a White-collared Swift from the evening flight to the falls at El Salto, San Luis Potosí, February 24, 1951. Also, one falcon at Terminal, northern Zacatecas, March 6, 1951.

White-throated Falcon (*Falco albigularis*).—One between Guerrero and Ebano, San Luis Potosí, February 28, 1951.

Pigeon hawk (*Falco columbarius*).—Two at an elevation of about 5000 feet along the Pan-American Highway north of Jacala, Hidalgo, February 28, 1951.

Whooping Crane (*Grus americana*).—On February 23, 1951, about 58 miles southwest of Matamoras, Tamaulipas, one pair was seen flying north at a height of 300 to 400 feet, occasionally calling as they passed.

Coot (*Fulica americana*).—One on the Río Naranjo below El Salto, San Luis Potosí, February 24, 1951.

Hudsonian Curlew (*Numenius phaeopus*).—Between Gomez Palacio and Bermejillo, Durango, one was in an irrigated alfalfa field near the highway, March 9, 1951.

Bonaparte Gull (*Larus philadelphia*).—One was flying over, and resting on, the waters of the Gulf of Mexico, off the end of the Río Panuco jetty, Tampico (Madera), Tamaulipas, March 1, 1951.

Ground Dove (*Columbigallina passerina*).—One or two at Terminal, northern Zacatecas, March 5 and 8, 1951.

Black-billed Cuckoo (*Coccyzus erythropthalmus*).—One was active early on the morning of February 26, 1951, at Tamazunchale, San Luis Potosí.

White-collared Swift (*Streptoprocne zonaris*).—A few along the Pan-American Highway in Hidalgo, to the southwest of Tamazunchale, San Luis Potosí, at an elevation of about 3500 feet, February 26, 1951.

White-throated Swift (*Aëronautes saxatalis*).—Several near the north base of Mt. Timarosa, northern Zacatecas, at an elevation of about 7300 feet, March 7, 1951.—Fred G. Evenden, jr., *Sacramento, California, October 14, 1951.*

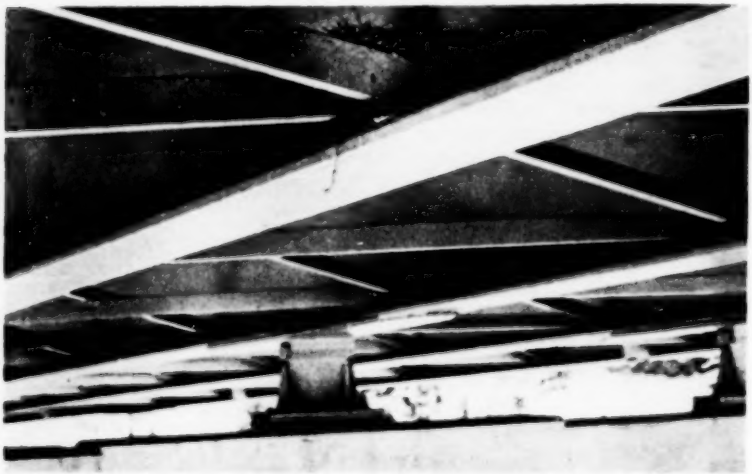
Ducks killed during a storm at Hot Springs, South Dakota.—Newspaper accounts of wildfowl striking wet pavements, buildings, or other obstructions in a city are common, but it is unusual to be able to verify the statements. According to the local paper of Hot Springs, Fall River County, South Dakota, about 500 ducks were killed or injured on the night of October 25, 1951, when fog, rain, and snow prevailed. Through the courtesy of Harry R. Woodward, Naturalist, and Superintendent of Schools at Hot Springs, the following information was received:

Ducks are frequently killed at Hot Springs when certain weather conditions prevail. Hot Springs is unusual in that it has a warm stream running the full length of the city. The water never freezes and when the atmospheric temperature is low, the water steams a great deal. About 100 Mallards (*Anas platyrhynchos*) live on the river permanently.

The main paved street of Hot Springs is lighted and when a snowfall occurs the lighted street appears like the stream itself. The ducks apparently do not see the main stream on account of the fog and the quacking of the local ducks seems to add to their

confusion. As a result they try to alight in the street. In attempting to alight on the concrete pavement, they fly into the adjacent buildings, nearby bluffs, telephone poles and wires, trees, or other obstructions. Many ducks are stunned or killed. I estimated that of the ducks killed during the storm of October 25 about 75 per cent were Redheads (*Aythya americana*), 10 per cent Mallards, and the remainder Scaups (*Aythya* sp.), Shovellers (*Spatula clypeata*), and Ruddy Ducks (*Oxyura jamaicensis*).—A. W. Schorger, *Department of Wildlife Management, University of Wisconsin, Madison, November 29, 1951.*

Mourning Dove nests in unusual site.—On July 14, 1950, Charles C. Carpenter, David E. Delzell, John D. Goodman, and I observed an adult Mourning Dove (*Zenaidura macroura*) on a nest which appeared unusually large for this species. After flushing the



bird I noticed that the nest containing two eggs was built on top of an empty Robin (*Turdus migratorius*) nest which apparently was at least a year old.

The nest was partly between and partly on top of two steel bracing beams, one horizontal and one upward diagonal, where they met the vertical side of a main steel support beam under a concrete highway bridge across Alvin Creek about five miles southeast of Delaware, Ohio.

Reports of Mourning Doves building nests near or over water and their use of old Robin nests as supports are frequent in the literature, but this Phoebe-like situation appears unusual to me.—H. Lewis Batts, jr., *Biology Department, Kalamazoo College, Kalamazoo, Michigan, September 6, 1951.*

Breeding status of the White-necked Raven in Kansas.—Although the White-necked Raven (*Corvus cryptoleucus*) was alleged to have disappeared from Kansas many years ago (see A.O.U. Check-List, 1931, p. 226; Long, 1940. *Trans. Kansas Acad. Sci.*, 43:448; and Goodrich, 1946. *Rpt. Kansas State Bd. Agric.*, 44, No. 267:247) this bird is

now a fairly common nesting resident on the high wheatland plains of western Kansas. Richard and Jean Graber (1950, *Wilson Bulletin*, 62:207) reported these birds in Hamilton and Kearny counties in the spring of 1950.

During the nesting season of 1951, I observed forty-six nests of this species in 14 western Kansas counties and was told that they nested in still another county. The number of nests observed in each county is as follows: Cheyenne, 3; Ford, ?; Finney, 12; Greeley, 1; Hamilton, 4; Haskell, 3; Hodgeman, 4; Kearny, 2; Rawlins, 1; Scott, 6; Sherman, 5; Stanton, 1; Thomas, 2; Wallace, 1; Wichita, 1.

In this area the nest is distinctive in that it is made almost entirely of wire mixed with a few coarse weed stems and lined with sheep wool. This nest almost invariably is placed in the open away from streams, wooded areas, and human dwellings. Twenty-one of the nests observed were in windmill towers, five were on highline or telephone poles, and the remaining twenty were in isolated trees. They varied from six to fifty feet in height above the ground. The first nest containing eggs was observed March 31; it contained four eggs.

Because White-necked Ravens closely resemble crows (*Corvus brachyrhynchos*) in many of their habits and actions, they are called crows by the local inhabitants. The differences between the two birds can be detected in the field by close observation. The ravens are somewhat larger than crows and their wingbeat is slower. The call is a hoarse *kraak* instead of a high-pitched *caw*. In the hand, White-necked Ravens are easily distinguished from crows by the white basal portions of the feathers of the neck, lower throat, and breast in the former. Further, the raven's bill is more massive and wider at the base.

Young White-necked Ravens, when nearly fledged, sit conspicuously on the edge of the nest and are often shot by gunners.—Marvin D. Schwilling, *Kansas Forestry, Fish and Game Commission, 310 Washington St., Garden City, Kansas, October 19, 1951.*

***Pendulinus* a prior name for nectar-adapted orioles.**—Both Melvyn A. Traylor, Jr. and Kenneth C. Parkes have called my attention to an error on my part in designating *Bananivorus* Bonaparte, 1853 (type, by orig. desig., *Oriolus bonana* Linn.), as the first available generic name for the nectar-adapted orioles (Beecher, *Wilson Bull.*, 62:51–86). *Pendulinus* Vieillot, 1816 (type, by subsequent desig., *Oriolus spurius* Linn.), is clearly a prior name. It was not until long after I had fixed upon the availability of *Bananivorus* for the nectar-adapted line of orioles that I realized *spurius* belonged in it. The shift was made without focusing attention on the fact that it called for a change in the generic name.—William J. Beecher, *Chicago Natural History Museum, Chicago, Illinois, December 11, 1951.*

EDITORIAL

James Bond, of the Academy of Natural Sciences of Philadelphia, recently has been awarded a Musgrave Medal by the Board of Governors of the Institute of Jamaica, B.W.I., with the following citation: "In recognition of your contributions to West Indian ornithology, and particularly in recognition of the stimulus and assistance which you have given to the study of birds in Jamaica."

At the recent meeting in Gatlinburg, the Executive Council of the Wilson Ornithological Club decided that since the Canadian dollar has now come to parity, or better, with the United States dollar, the need has vanished for the Club to have a Canadian bank account and a Canadian assistant to the Treasurer for the service of Canadian members. The Council authorized discontinuance of the Canadian account. William W. H. Gunn, who served as Canadian assistant to the Treasurer, was thanked by the Council for helping out in this financial problem which existed only a few months ago.

The Illinois Audubon Society has established recently a Junior Wildlife Management Award. This will be awarded not only for a good plan for sound management practices but also for results obtained through putting the practices into effect.

Members are reminded again of the Club's urgent need for extra copies of the March, June, and September issues of *The Wilson Bulletin* for 1951. These copies should be sent to the Wilson Ornithological Club Library, Museum of Zoology, University of Michigan, Ann Arbor, Michigan. If you don't keep a file of the *Bulletin*, please help out the Club in this way.

Psittacosis at Cape Cod.—A recent article in the *Journal of the American Medical Association* (Chapman, 1951:1343–1344) reports a case of psittacosis in a human at Cape Cod, Massachusetts. The patient had had no direct contact with birds, but had twice cleaned a bird-feeding station; each time she had brushed disintegrated bird-droppings toward her with a whisk broom. "During the period when infection might have occurred, a family of purple finches were frequent visitors to the station. Finches are known to be carriers of psittacosis. In the course of the summer a catbird, a robin, and a finch were found dead but showed no signs of injury" (p. 1344).

The disease was characterized by a prolonged convalescent period after the disappearance of fever.—K.R.K.

Report of Treasurer for 1951

Balance as shown by last report, dated December 31, 1950	$1,560.87

Receipts

Dues:	
Associate	1,564.00
Active	2,287.00
Sustaining	775.00
Subscriptions to "The Wilson Bulletin"	222.50
Sale of back issues and reprints of "The Wilson Bulletin"	195.26

Gifts: Color Plate Fund	250.50	
Mrs. Sarah L. Hilton Gift for Dr. David Clark Hilton Memorial Color Plate Fund	1,898.00	
Henry J. Nunnemacher Gift for December Gertrude A. Nunnemacher Memorial Issue	1,250.00	
Miscellaneous	67.41	
Proceeds of auction of paintings at Davenport, Iowa, meeting	399.96	
Transferred from Endowment Fund (interest on bonds, etc.)	191.25	
Total receipts		$10,661.75

Disbursements

"The Wilson Bulletin"—printing, engraving, mailing	$5,408.99	
Color plates for "The Wilson Bulletin"	2,430.64	
Editor's expense—printing, postage, secretarial aid	146.75	
Secretary's expense—printing, postage, clerical aid	23.41	
Treasurer's expense—printing, postage, clerical aid	427.49	
Membership Committee expense—printing, postage	45.69	
Annual Meeting expense	110.73	
Purchase of books from Book Fund	5.50	
Bank charges, foreign exchange, corporation papers and miscellaneous expenses	8.64	
Transferred to Endowment Fund a/c Edward L. Chalif and Special Research Grants	300.00	
Total disbursements		$ 8,907.84
Balance on hand in Citizens Fidelity Bank and Trust Company, Louisville, Kentucky, December 31, 1951		$ 1,753.91

Endowment Fund

Cash balance in Savings Account December 31, 1950	$ 668.65	
Received during year:		
Interest on U. S. Bonds and on Savings Account	$ 171.70	
Life Membership payments	1,100.00	
Gift of Edward L. Chalif for Research Grant	200.00	
Transfer of Special Research Grants from checking account	100.00	
Transfer of reserve from Louis Agassiz Fuertes Research Grant Fund (1951)	100.00	
Total receipts		$2,340.35
Disbursed during year:		
Transferred to checking account (interest on bonds, etc.)	$ 191.25	
Louis Agassiz Fuertes Research Grant payment	100.00	
Edward L. Chalif Research Grant payment	200.00	
Bank charges a/c State Tax	1.81	
Total disbursements		$ 493.06
Balance cash in Savings Account, December 31, 1951		$1,847.29
*Securities Owned***		
U. S. Postal Savings Coupon Bonds, dated July 1, 1935	$ 780.00	
U. S. Savings Bonds, Series "G", dated September 1, 1943 (maturity value $1,000.00)	967.00	

U. S. Savings Bonds, Series "G", dated September 20, 1944 (maturity value $1,500.00)	1,441.50	
U. S. Savings Bonds, Series "G", dated June 1, 1945 (maturity value $500.00)	479.00	
U. S. Savings Bonds, Series "G", dated July 1, 1945 (maturity value $900.00)	862.20	
U. S. Savings Bonds, Series "G", dated October 1, 1945 (maturity value $1,400.00)	1,337.00	
U. S. Savings Bonds, Series "F", dated February 1, 1947 (maturity value $2,000.00)	1,572.00	
U. S. Savings Bonds, Series "F", dated April 1, 1948 (maturity value $2,000.00)	1,534.00	
U. S. Savings Bonds, Series "F", dated October 1, 1948 (maturity value $1,450.00)	1,102.00	
U. S. Savings Bonds, Series "F", dated April 1, 1950 (maturity value $1,000.00)	745.00	
Total securities owned**		$10,819.70
Total Endowment Fund		$12,666.99

** Bonds carried at redeemable value December 31, 1951.

In reserve:	
Louis Agassiz Fuertes Research Grant Fund (special gift)	$ 125.00
S. Morris Pell Fund (special gift)	75.00

Respectfully submitted,
LEONARD C. BRECHER, *Treasurer*

December 31, 1951
Approved by Auditing Committee:
BURT L. MONROE
MRS. HERBERT E. CARNES
FREDERICK V. HEBARD, *Chairman.*

THE WILSON ORNITHOLOGICAL CLUB LIBRARY

The following gifts have been recently received. From:

Elizabeth B. Beard—1 reprint
William H. Behle—8 reprints
Ivan L. Boyd—6 magazines
John Davis—49 reprints
Ralph W. Dexter—7 reprints
Eugene Eisenmann—1 pamphlet
Betty Carnes—1 book
Henry S. Fitch—1 book
F. J. Freeman—9 magazines
Richard Graber—2 reprints
Karl W. Haller—1 book, 1 bulletin
Wm. A. Lunk—1 translation (of article from a German serial)
Margaret M. Nice—1 book, 8 reprints, 4 magazines
Frank A. Pitelka—2 books, 11 reprints
Hustace H. Poor—22 magazines
T. Wayne Porter—1 reprint
Georg Steinbacher—11 reprints
Josselyn Van Tyne—1 book
Alexander Wetmore—5 pamphlets
L. R. Wolfe—21 pamphlets and reprints
Howard Young—3 reprints
Dale A. Zimmerman—1 reprint

ORNITHOLOGICAL LITERATURE

MEXICAN BIRDS . . . FIRST IMPRESSIONS . . . BASED UPON AN ORNITHOLOGICAL EXPEDITION TO TAMAULIPAS, NUEVO LEON, AND COAHUILA . . . WITH AN APPENDIX BRIEFLY DESCRIBING ALL MEXICAN BIRDS. By George Miksch Sutton. University of Oklahoma Press, Norman, 1951:7 × 10 in., xvi + 282 pp., with 16 color plates and 65 pen-and-ink drawings. $10.00.

This attractively composed book is a record of Sutton's first field expedition to Mexico. The jacket-flap, with more than usual accuracy for jacket-flaps, states that "the first part is an informal account of the author's day-to-day experiences in the field, his intensely subjective thrill at finding a new species, and his cool, objective, and detailed descriptions of the birds he saw . . . Mr. Sutton has written *Mexican Birds* in the form of a personal narrative 'because students of Mexican birds will most likely go through much that I went through in adjusting myself to the fact that many birds there are the same as, or closely related to, those of the United States . . .' " The text is a diary-type account introducing the reader to several ecologic groupings of birds in northeastern Mexico. One of the high points is the experience with the Faisan Reál (*Crax*), in which the reader gains insight into the bird *and* into the knowledgeable Mexican guides, the author, and the small drama of the hunt.

From the popular and explicit style of the text, I assume that the author addresses himself to readers with non-technical interest, and it therefore seems quite unnecessary to pepper the pages with scientific names. These are given again in the appendix anyway, along with vernacular names. The text would read more smoothly without the Latin names.

The author makes a considerable effort to suggest vernacular names for Middle American birds poorly named or as yet without such names. This he does in a constructive and sensible way. The topic is one always leaving room for difference of opinion, and recognizing this I would take exception to only one of his usages. Why should the familiar Carolina Wren, the species *Thryothorus ludovicianus*, be called Berlandier's Wren when one watches it in Nuevo León? This name is used by Hellmayr and, like so many others of his, should be ignored. Among other names used by Sutton, some very apt species vernaculars are suggested, and the reviewer believes ornithologists should try to use them.

The second part of this book, an appendix of 71 pages, is a summation of Mexican bird-life, with brief descriptions and clues to field identification, all especially useful now because no other guide is available. For the "tough" families, like the hummers, flycatchers, and finches, the appendix concisely reviews the fauna so that the student can meet the challenge of each family a little more optimistically. Although the title states that *all* "Mexican" birds are mentioned, at least the following are omitted: *Pipilo rutilus*, *Xenospiza baileyi*, *Aechmolophus mexicanus*, and *Amaurospiza relicta*. And of these, the first three are probably not so rare or so restricted in distribution as first thought to be. Sutton *does* list other poorly known species, such as *Neochloe brevipennis*. Certainly the omitted four ought to be included in the appendix if one bothers to mention, as Sutton does, *Vireo bairdi* from Cozumel Island or *Mimodes graysoni* from Socorro Island. Any traveller-ornithologist is less likely to go to some of these islands than to the heart of the mainland, where he stands a chance of meeting *Xenospiza* or *Aechmolophus*.

In the appendix, various problems of distribution and taxonomy are reflected from the

sources, such as Ridgway and Hellmayr, on which the author has relied, and he ventures opinions here and there which point up interesting problems. In the jays, I agree with his comments on *Psilorhinus*, but not with those on *Cissilopha*, in which the species *sanblasiana* and *beecheii* occur together in Nayarit, a fact evidently not known to Sutton. To some extent Sutton has slighted, unintentionally I think, the southern part of Mexico, about whose geography his text is vague. He gives the impression that the term Mexican plateau applies to all highland Mexico west of the Isthmus of Tehuantepec. At any rate, *Atlapetes pileatus* is said to be "restricted to the Mexican plateau" (page 57), whereas it occurs in the Sierra Madre del Sur, south of the Mexican plateau proper, in Oaxaca and Guerrero. Both the Scrub and Mexican jays are said to occur "throughout most of the plateau" (page 232), whereas the former also occurs farther south, in the Sierra Madre del Sur.

Like the small boy saving a bit of decorative cake frosting till last, I come to the illustrations. These are superb. The color plates are well reproduced and display the high level of Sutton's ability and versatility. The pen-and-ink sketches catch the spirit of the living bird remarkably well. They have an ease and simplicity of line that indicates Sutton's first-hand, competent acquaintance with birds as subjects. The confidence shown by his drawings is fully justified.—Frank A. Pitelka.

THE DEVELOPMENT OF ORNITHOLOGY. FROM ARISTOTLE TO THE PRESENT. (DIE ENTWICKLUNG DER ORNITHOLOGIE. VON ARISTOTELES ZUM GEGENWART.) By Erwin Stresemann. F. W. Peters, Berlin W15, 1951: xiv + 431 pp., 15 plates. 32 DM.

For many years Dr. Stresemann has contributed articles to journals in his own and other countries on the history of ornithology. Now he presents the fruits of his extensive studies in an impressive and scholarly volume.

The first section of the book deals with the period from the foundations of ornithology to the seventeenth century, the second and longest section with the development of systematics and the study of evolution, and the final section with the development of bird biology.

Aristotle raised bird study to the level of a science; for two thousand years he remained the chief authority. No significant new contribution was made until the thirteenth century when Frederick II of Hohenstaufen composed his remarkable "Art of Falconry," which, to the great loss of ornithology, remained unknown due to the hostility of the Church. Albertus Magnus, in the Middle Ages, and Gesner, in the Renaissance, transcribed the information of their predecessors from the Ancients down; both possessed the spirit of inquiry and omitted or questioned much that was fabulous.

At first biology and systematics traveled together; from the time of Aristotle ornithologists had tried to classify birds according to biological characters and thus they learned much about ecology and habits. This system, however, became increasingly unsatisfactory, especially because of the exotic species that were being discovered. In 1676, Willughby and Ray presented their system based, not on function, but on form, namely, structure of bill and feet and size of body. The history of many schemes of classification from that time to the present is traced in fourteen chapters with much attention given to explorations and amassing of collections, special chapters being devoted to Levaillant, Temminck, Bonaparte, and Finsch. The profound effect of Darwin's "Origin of Species" is described. There is an outline of the history of trinomial nomenclature as it was instituted by Schlegel, adopted by the American Ornithologists' Union in 1885

through the influence of Baird, Ridgway, J. A. Allen, and Coues, then reintroduced into Europe, despite opposition, by Hartert.

Attention is drawn to two little known eighteenth-century pioneer students of the living bird, Pernau and Zorn. Both were teleologists, but teleology had given rise to more advances in knowledge than the causal school, because chemistry and physiology were largely undeveloped. It was Darwin who was able to reconcile Aristotelian teleology and mechanism; instincts were as important as bodily form and depended on inherited modification of the brain; inherited variation and selection brought about fitness. During the nineteenth century field study advanced, then stagnated again. The last chapter deals with present day research: the study of migration and populations with the aid of banding; study of life history and behavior with color banding; experiments on orientation and homing; laboratory experiments on physiology, metabolism, and the migratory impulse; ecological investigations and the researches in behavior of Lorenz. Systematists and geneticists are now occupying themselves with biological problems.

Dr. Stresemann has presented a vast amount of information, most interestingly written with quotations from works of the writers' and vivid characterizations of the different men. His book is far more than a narrative; the quality of an individual's work and its influence are appraised and the various philosophical points of view described. There are six pages of selected bibliography, thirty-five pages of appendix containing 126 notes, indices of subjects and persons, and fifteen well-chosen photographs.

This is a masterly work, an illuminating history of our science; it gives a background to present day students and an appreciation of the problems that confronted our predecessors. It will serve as an incentive to be worthy of our heritage, an inspiration to a keen and dedicated search for truth.—Margaret M. Nice.

Crip, Come Home. By Ruth Thomas. Harper & Brothers, New York, 1952: 5¼ × 7½ in., 175 pp., 1 plate. $2.50.

This charming book is based on the most comprehensive study that has been made of the behavior of the Brown Thrasher (*Toxostoma rufum*). It contains much material not known previous to Mrs. Thomas' observations of color-banded individuals that returned to her home for many successive years. Written in part in diary form, it has warmth, pathos, and beauty. The reader glimpses the members of the household, the wildlings and domestic creatures, and the environment of a hill-top country home in Arkansas.

The narrative centers around Crip, the first Brown Thrasher the author banded in April 1937, and then watched through ten summers and four winters. For the first three seasons he returned with the same mate. In his fourth summer, he suffered a broken wing which healed in an abnormal position. Although he escaped predators and eventually regained awkward flight, he did not migrate the following two autumns (1940, 1941). He migrated in October of 1942 and 1943, returning in March. But he spent the winters of the next two years (1944, 1945) at the Thomas home, disappearing finally in October, 1946.

In addition to the detailed story of this remarkable bird, other Brown Thrashers that lived as neighbors or mates of Crip make pertinent bird history. Red, another male, lived on Crip's Hill five seasons; Greta also lived there five seasons, the first two as Crip's mate and the other three as Red's mate. In late summer, after nesting, she became a pre-migration companion of Crip in the latter years. Of particular interest is the final

Mrs. Crip who was his mate in 1944, 1945, and 1946. She was a late arrival each spring. In 1945 and 1946, Crip had already won a mate and was busy with nest-building when Mrs. Crip came from the south. In both years, she drove off the newcomer and resumed her place as Crip's mate on the old nesting territory. In 1945, she laid her eggs in the completed nest of the vanquished female.

Details of Brown Thrasher territorial and mating behavior, care of the young, severance of the pair bond in summer or early autumn, and arrival and departure dates are given.

Types of song are described including the introduction by Crip of songs of other species into his repertory, and the singing of the female. Also described is a territory-boundary-line maneuver or dance like that of the Mockingbird, the wing-lifting display of juveniles, and the wing-lifting of adults at sight of a dead snake.

The book may be read for enjoyment of a beautiful piece of nature writing, then used for study or reference. The frontispiece is a photograph of Crip; end papers show sketches of Crip's Hill.—Amelia R. Laskey.

AN ANALYSIS OF THE DISTRIBUTION OF THE BIRDS OF CALIFORNIA. By Alden H. Miller. University of California Publications in Zoology, Vol. 50, No. 6, University of California Press, Berkeley and Los Angeles, 1951: 6¾ × 10¼ in., pp. 531–644, plates 32–40, 5 figs. in text. $1.50.

The birds of California have been studied intensively over a period of several decades with a wealth of data having accumulated. The last summary of the distribution of the species geographically within the state was presented in 1944 by Grinnell and Miller (*Pacific Coast Avifauna*, No. 27:1–608). At that time it was projected that some generalizations and analyses arising from the work should be included. This, however, did not prove to be practicable. They appear at long last in the present publication. Incidentally, since the two are companion volumes, the names, both vernacular and scientific, are, with few exceptions, the same. A synopsis of the few changes in taxonomy and distribution is given in an appendix of the present work.

With respect to certain difficulties encountered in an effort to develop broad distributional principles, the author comments (p. 531) that "we are unable to resolve distributional patterns into a neat system comparable to the periodic table of chemistry, the chromosome map of genetics, or even the imperfect phyletic taxonomy of the systematist. There is no single sequential organization of distributional data. We are confronted with the end results of an array of delicate and complicated equilibria, in which the spatial balance of each species is a phenomenon peculiar to itself because of heritable differences interacting with the influences of many other species and of inorganic factors." The three general plans for handling distributional information on the terrestrial animals in North America are the life zone, biome, and biotic province systems. An evaluation is given of each of these and their applicability to California birds is considered at length. As a result some modifications of the plans are suggested and some coordination effected.

As pertains to life zones, 260 species are tabulated, being placed in the one or more zones where they are known to occur. Comparisons between the avifauna of the various adjoining zones are made on several bases. It is concluded that "for purposes of showing zonal relations and importance in California we may justifiably group the three cool zones (Canadian, Hudsonian, and Alpine-Arctic) as subzones of an inclusive Boreal Zone, as has frequently been done, but heretofore without well-defined basis." A major division occurs in California between the Upper Sonoran and Transition zones.

In classifying and describing avian distribution in terms of ecological formations there is the problem of the degree to which subdivisions would be useful. Miller has selected 21 situations which are intermediate between the broad plant formations or biomes and the plant associations. His selections are based more on the life form of the plant cover or physical aspects of rock and aquatic habitats than on succession. The characteristics of each formation and its zonal and geographical distribution in the state are given and those birds known to occur in each formation are listed. Based on known conditions of their summer habitat 274 species are so classified ecologically. Since most occur in more than one ecologic formation, all these formations that a particular bird is known to occur in are indicated by abbreviations of the name of the formation. Furthermore a superior number is used to show whether the affinity to the particular formation is of first, secondary, or lesser importance. The ratings are "based on the greatest concentrations of the species and on the provision of the most critical and limiting factor from the standpoint of existence of the bird concerned." The author fully realizes the subjective nature of the ratings and the lack of precise equivalence and comments that in the earlier book (Grinnell and Miller, *op. cit.*) the true picture of ecologic occurrence is given individually by species in the description of habitat. Miller has devised a relationship score to show something of the affinity of one formation to another with respect to their significance to birds. These are tabulated and expressed graphically as well as discussed. Comparisons are made of zones and formations from which Miller concludes that "zonal and formational systems are partly independent, each expressing a set of distributional facts, one often supplementing the other. For one group of species one appears more adequate than the other and for another group the opposite is true. More precision in general is registered by the formational system, partly because it is more finely divided, as here employed, and partly because it reflects climatic factors in addition to temperature; but its greater utility is not universally true. If, as contended, each system has its values and its set of factors to register or emphasize and the two are in a measure supplementary, there is little point in debating which is superior. The important thing is to know the values of each and to avoid improperly magnifying them."

In his discussion of faunal groups, the author refers to an earlier critique of the biotic province concept (Johnson, Bryant, and Miller, *Univ. Calif. Publ. Zool.*, 48, 1948:221–376). The present analysis is based on four major avifaunas "delimited admittedly somewhat arbitrarily, on the basis of strong or repeated association of species which have similar centers of distribution and probably often similar areas of origin." Three (Boreal, Great Basin, and Sonoran) center in areas beyond the state and are intrusive in California. The other, which he terms California, is endemic. Each of these groups contains subfaunas which occupy different areas within the state. The avifaunas of each are described and the species and races occurring in each are listed. The subfaunas are evaluated objectively by determining the actual degree of difference in make-up between them by matching lists of members of the fauna from two areas on a numerical basis. The total count is an index of difference reflecting not only limits of occurrence within boundaries but also the forms that have differentiated within the areas. This objective test of the distinctness of the geographic biotic provinces led to the recognition of different ranks of areal subdivision, so that provinces, districts and areas are units of decreasing importance. A list of species that do not fit into this scheme is attached. It includes chiefly species of marine environments and forms of continental or holarctic distribution.

In his concluding discussion, Miller relates the wealth of data pertaining to California

to the ultimate objective of the study of distribution which is to explain the mechanism of avian evolution. He correlates the zonal and formational ranges with differentiation, weighs the role of historic factors operative in California and discusses the factors of climate and isolation in relation to microevolution. Thus not only is this paper a summary and supplement to the earlier work on the distribution of the birds of California, but it contains a scholarly presentation of the concepts of evolution of birds in the state. Furthermore the data are expressed in an objective form that will allow comparisons with distributional features in other areas when such are similarly summarized.

All those ornithologists who have worked on the birds of California can take pride in this work, for even though it is a rare individual who has the comprehension and skill for such an undertaking, the summary is made possible only by the gradual accumulation of facts of distribution by many individuals over a long period of time. This treatise shows the complexity of the problem of distribution and the value in greater or lesser degree of the several distributional concepts. It would appear that extreme positions such as renouncing life zones are untenable.—William H. Behle.

GRONLANDS FUGLE. THE BIRDS OF GREENLAND. Part 3. By Finn Salomonsen. Ejnar Munksgaard, Copenhagen, 1951: 9 × 13 in., pp. 349–608, 15 color plates and numerous black and white sketches by Gitz-Johansen, and a separate map, 15½ × 22½ in., in color. $42 for the three volumes and map. Decorative bindings obtainable at extra cost from the publisher.

This, the final part of Salomonsen's opus, contains full writeups on seven alcids, one eagle, two falcons, two owls, and ten passerine birds; a systematic list of all Greenland birds (224 numbered forms); an extensive bibliography; and an index of scientific, Danish, Eskimo, and English names. The writeups on the Great Auk (*Pinguinus impennis*), Atlantic Guillemot (*Uria a. aalge*), Short-eared Owl (*Asio f. flammeus*), Fieldfare (*Turdus pilaris*), American Water Pipit (*Anthus spinoletta rubescens*), Meadow Pipit (*A. pratensis*), and White Wagtail (*Motacilla a. alba*) are rather short—evidence that these birds have never been very common on the island. The last four of these actually breed in small numbers, however; *Uria aalge* also breeds very locally; and the Great Auk "possibly bred in mediaeval times." The Short-eared Owl, contrary to popular belief (see A.O.U. Check-List, 1931, p. 171), does not breed; the 33 records for it fall into spring (May-June) and autumn (October-December) groups, just as do records for the two races of Green-winged Teal (*Anas crecca*) and the two golden plovers, *Pluvialis apricaria* and *P. dominica*.

The author's treatment of *Acanthis flammea* is exceptional: although regarding all redpolls as one species he nevertheless presents a full writeup on each of the two subspecies found in Greenland—*Acanthis flammea rostrata* (Greenland Redpoll) and *A. f. hornemanni* (Hornemann's Redpoll). He believes that the "life habits . . . in the breeding season" of these two forms (of all redpolls, for that matter) "are identical." Calling them the same species does not, however, seem to satisfy him completely. He is aware of the fact that in certain other parts of the Arctic the range of the stub-billed, white-rumped form does not strictly complement that of the proportionately longer-billed, streaked-rumped form, and that in these areas the two birds "behave like sympatric species, breeding together in the same locality without interbreeding." Having witnessed this sympatric breeding myself at Churchill, Manitoba, I cannot help believing that the two are full species; that their ecology is not precisely the same; and that behavior differences will come to light as careful field observations continue. Salomonsen's treatment

of the gyrfalcons is quite different from that which he accords the redpolls. Although believing that three "phases" of *Falco rusticolus* inhabit the great island, he nevertheless discusses them all in one major writeup. Whether he considers these "phases" to be actual subspecies is not quite clear; he discusses the dark, gray, and white "phases" as, respectively, the *obsoletus*, *holboelli*, and *candicans* types. The dark and gray phases are southern, "being gradually replaced by the white phase to the north. However they do not form an ordinary cline, but what may be called a trimorph ratio cline."

As in Parts 1 and 2, much space is given details of distribution. Particularly is this true of the alcids. The whereabouts of virtually every Razor-bill (*Alca torda*), Little Auk (*Plotus alle*), Puffin (*Fratercula arctica*), and Brünnich's Guillemot (*Uria lomvia*) colony in Greenland is given, together with careful estimates as to the size of many of the colonies. The Black Guillemot (*Cepphus grylle*) breeds so widely and often in such small colonies that it receives more general treatment. The Razor-bill, we are told, "always joins colonies of other sea-birds, either auks or gulls." In these mixed colonies there usually is no real competition for nest sites because the several species nest in different sorts of places—the Razor-bill in fissures, the Puffin in burrows in turf, the Little Auk among piles of rocks, the gulls on open ledges, etc.; but "on the coast of small islands, in rough talus of large blocks or in crevices in the firm rock, usually near the water's edge," *Alca*, *Plotus*, *Fratercula*, and *Cepphus* all may breed "indiscriminately amongst each other, apparently without competition."

Of interest are the discussions of food habits—the strikingly different ways in which the various alcids bring food in for their young; the Gyrfalcon's virtually exclusive use of lemmings when that mammal is abundant; the Peregrine's (*Falco peregrinus*) method of holding a puffin back-down when feeding, and of leaving the wings (often also the head) untouched and attached to the clean-picked sternum.

It will surprise many readers to learn that young Brünnich's Guillemots, when about three weeks old and still wholly unable to fly, jump "out from the ledge at the call from the parents, which swim in the water below the cliff." Though the ledge may be three hundred feet high, down the young ones go. Usually they strike the water. Some "end the jump on rocks . . . but this does not apparently hurt them."

Regrettably, Salomonsen does not discuss the flightless period adult alcids presumably live through while undergoing their postnuptial molt. Having myself collected flightless Black Guillemots in northern Hudson Bay, I know something about the behavior of that species during this molt. But what of the Little Auk? Does it pass the flightless period in rafts composed of thousands of birds out at sea—or does it, indeed, become flightless at all? Another matter I had hoped to find information on: the behavior of resident birds at high latitudes in the dead of winter. The Black Guillemot, Gyrfalcon, Snowy Owl (*Nyctea scandiaca*), and Raven (*Corvus corax*) are known to winter, at least to some extent, very far north. How do they behave when darkness shuts down? What is their 'daily routine' at this season?

Finally, a word about the color plates. From the standpoint of technique I find them remarkably satisfying. Obviously primitive, they look as if they might have been drawn on the walls of caves. My enthusiasm for them must not be interpreted as professional generosity or mere broadmindedness. Some art critics glory in proclaiming their power to see beauty where the "layman" certainly cannot see it; balance where no weight of any sort seems to exist; "dynamic symmetry" where all one can see is a lot of meaningless shapes. This sort of mumbo-jumbo I abhor. But I do admire any artist with drive and bravery enough to put down unconventional concepts he considers worth recording. Gitz-

Johansen could never have done this long series of drawings without loving Greenland and its birds. With an eye for color and color-contrasts, and with great skill in laying down paint and keeping it fresh, he made these pictures *in Greenland*. As a group, I like them. But comparing them with "average" bird illustrations would be silly. They were not made as charts of birds, *i.e.*, detailed studies on which descriptions could be based. They are not bird portraits in any ordinary sense of the phrase. They are Greenland, seen by a lover of birds through Greenland air.—George Miksch Sutton.

PREDATOR CONTROL IN THE LIGHT OF RECENT WILDLIFE MANAGEMENT CONCEPTS

Control of predators, both avian and mammalian, has long been predicated on the hypothesis that a "good" predator was a dead predator and that each one killed meant the certain survival of additional numbers of the prey species for the everlasting enjoyment of the naturalist or the increased bag of the hunter. This belief dominates the thinking of many—both administrators and ornithologists—and controls the action policy of many state and federal agencies.

Let us examine three specific cases in point:

American mergansers gather in winter on waters providing the best fishing for them, and sometimes these are the best waters for man's fishing as well. Hence, thousands are to be found on the reservoirs of the arid Southwest. Their fish-eating activities on these bodies of water, especially Elephant Butte Reservoir in New Mexico, have caused the state department of conservation to secure federal permits to kill them by the thousands with shot guns fired from motor boats. This legalized slaughter of a species protected elsewhere as game has been justified by brief, unpublished studies of merganser food habits, which leave some doubt as to how conclusive are the data concerning the proportion of game fishes being taken, the ages of these fishes, and the significance of their numbers. With overwhelming evidence accruing on every side showing that most impoundments are teeming with slow-growing, stunted fishes resulting from overcrowding with fish too small to be catchable, the significance of fishes taken by such predators as mergansers, herons, and pelicans is completely changed. Perhaps the productivity of many waters would profit in actual pounds of catchable fish if significant predation on the lower age-classes could be induced. Evidence for this has been shown by George Bennett of the Illinois Natural History Survey (*Trans. 12th. North Amer. Wildl. Conf.*, pp. 276–285). He points out that Reelfoot Lake which has taken from it over 400,000 pounds of fish per year by birds alone also provides an average daily take per fisherman of five pounds, a yield exceeded by few, if any, other lakes in this country.

Perhaps in the future we may learn that to manage for an increase of fish-eating birds by attracting nesting colonies is also the best fish management.

It should further be pointed out that the merganser slaughter on Elephant Butte Reservoir has not accomplished any noticeable reduction in the number of mergansers found there. This means that more birds must be moving in and replacing the thousands killed. It then seems very doubtful that the control is accomplishing the claimed reduction in the numbers of fish eaten. Futhermore, what is the effect on the merganser population of the flyway? Is this lake, teeming with fish, to serve as a permanently baited trap to eliminate mergansers? Or, is this increased harvest more likely to stimulate the reproductive success of the mergansers so that the population may actually increase, or at least keep its present level of numbers?

This suggestion is not just a far-fetched possibility for it has been shown that among many populations of vertebrates the rate of increase following a breeding season is greatest when the species is in a low and that this rate of increase falls off in years when the species is in a high, or has an abundant spring breeding population. For a thorough review of the evidence concerning this concept of *inversity* see Errington (*Quart. Rev. Biol.*, 21:144–177, 221–245).

If some of the mergansers slaughtered could be put to some biological use, perhaps we would know the minimum age of breeding in this species, the percentage of juveniles in the population, and be able to compute their reproductive rates and, therefore, be in a better position to judge the effects of control measures. Techniques for these investigations have been worked out by game researchers and stand ready to be applied. We only wish to point out here that the supposed functions and the actual results of merganser control are unknown. Must we go on condoning action programs with such a dubious basis?

Another possible example of the functioning of inversity induced by man's control measures is the tremendous and persistent upsurge in coyotes as witnessed by their spread into hundreds of miles of new range. Not only has the taxpayer's money, wasted by this policy, proven ineffectual over the last 150 years in the United States, but also one wonders whether the upsurge in coyote populations may not have been induced in part by the harvest! We do not wish to imply that the causal relationships are either clear or simple for it is apparent that the same control efforts have almost completely eliminated the coyote's cousin, the timber wolf, as well as driven the mountain lion from much of its former range.

But now the specter of airplane-distributed new poisons, such as "1080," looms on the horizon for all predators and this latest blasphemy against nature provides the means for wiping out the coyote on the Great Plains. Are we again to see plagues of jackrabbits overrunning our cattle ranges as they did in the 1920's? Already early reports of jackrabbit increases in the Dakotas and elsewhere suggest that the shift is on the way. We may face a rabbit-controlled landscape such as England has experienced as a result of extreme predator control on her East Anglican heaths. Are we again to trade one problem species for another, and in the name of a "conservation action program"?

Recent studies by Lyle Sowls, at the Delta Waterfowl Research Station in Manitoba, have demonstrated the significance of renesting, primarily second nesting attempts made by ducks. Prior to this, Cartright (*Trans. 9th North Amer. Wildl. Conf.*, pp. 324–330) clearly explained how important predation on early nests was to actual species survival in upland game birds. He reasoned that if such single-brooded species nested unmolested by predators, a synchronized early nesting would result; this would make the production of the entire year vulnerable to complete destruction by severe late spring weather such as sleet, hail or flooding. In short, the best insurance against such a catastrophe is a prolonged and staggered nesting season *forced by destruction of a goodly proportion of first nests by predators.* Cartright has recently cited similar evidence from waterfowl populations (*Trans. 17th North Amer. Wildl. Conf.*). In the light of this new concept, the wisdom of mass bombings of crows in winter roosts is seriously challenged as a means for bettering duck nesting. Several state game departments in the Middle West have long pointed with pride to their organized slaughter of crows accomplished by night bombing in winter roosts and by shooting contests. But how many states can demonstrate that the crows they kill come from duck-nesting regions or otherwise are detrimental? Again we are having action programs of destruction thrust upon us by state agencies. It is time to

test the need for these actions since the predators eliminated may actually insure a higher average productivity in ducks or upland game.

In some outstanding waterfowl areas we have visited, crows are now comparatively scarce but skunks seem to have reached an all time high. Instead of being continuously classified and treated as vermin perhaps we may learn that this four-footed nest robber has only replaced in function his avian counterpart, the crow, in ensuring a staggered nesting season. In this way a crop of young ducks is never completely vulnerable to destruction by spring climatic catastrophies, such as the hail storms Alberta suffered in 1947 or the floods so destructive to duck nesting in Manitoba the same year.

Now that we have been provided with the concept of inversity as a widely operating population phenomenon, as well as some new angles of the predation equation, it becomes increasingly clear that the old dichotomy of "harmful" and "beneficial" is a meaningless and fallacious classification of living things. This division of all plant and animal species into two exclusive categories supposedly having an economic basis is deeply rooted in many fields of biology. That it is still used by authors of student texts, in botany, in entomology, in Farmers' Bulletins, etc., seems most deplorable. Unless we insist upon the forcible excision of this relic of past thinking from all our biological books, we will continue to raise generations which classify living things only on an economic standard.

This may be disastrous. At the rate our human population is expanding in the United States and the resulting increased rate of demand for room for public developments (now taking one-fifth of all our acreage) naturalists will be in no position to justify the preservation of any species or any area on an economic basis alone. If we are to have and to enjoy birds and to harvest wildlife on a permanent basis, we must provide the next generation with criteria other than monetary for judging the recreational, educational and esthetic value of landscape and wildlife.—William H. Elder and Charles M. Kirkpatrick.

Second Cooperative Study of Nocturnal Bird Migration

Studies of the nocturnal migration of birds, using small telescopes directed at the moon, are being continued this fall on a greatly expanded basis. Interested persons who have access to a small telescope are urged to write at once to Robert J. Newman at the Museum of Zoology, Louisiana State University, Baton Rouge, Louisiana. Details regarding project and procedure will be promptly supplied.—George H. Lowery, Jr.

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Suggestions to Authors

Manuscripts intended for publication in *The Wilson Bulletin* should be neatly typewritten, double-spaced, and on one side only of good quality white paper. Tables should be typed on separate sheets. Before preparing these, carefully consider whether the material is best presented in tabular form. Where the value of quantitative data can be enhanced by use of appropriate statistical methods, these should be used. Follow the A. O. U. Check-List (fourth edition) and supplements thereto insofar as scientific names of United States and Canadian birds are concerned unless a satisfactory explanation is offered for doing otherwise. Use species names (binomials) unless specimens have actually been handled and subspecifically identified. Summaries of major papers should be brief but quotable. Where fewer than five papers are cited, the citations may be included in the text. All citations in "General Notes" should be included in the text. Follow carefully the style used in this issue in listing the literature cited. Photographs for illustrations should be sharp, have good contrast, and be on glossy paper. Submit prints unmounted and attach to each a brief but adequate legend. Do not write heavily on the backs of photographs. Diagrams and line drawings should be in black ink and their lettering large enough to permit reduction. The Illustrations Committee will prepare drawings, following authors' directions, at a charge of $1 an hour, the money to go into the color-plate fund. Authors are requested to return proof promptly. Extensive alterations in copy after the type has been set must be charged to the author.

A Word to Members

The Wilson Bulletin is not as large as we want it to be. It will become larger as funds for publication increase. The Club loses money, and the size of the *Bulletin* is cut down accordingly, each time a member fails to pay dues and is put on the 'suspended list.' Postage is used in notifying the publisher of this suspension. More postage is used in notifying the member and urging him to pay his dues. When he does finally pay he must be reinstated on the mailing list and there is a publisher's charge for this service. The *Bulletin* will become larger if members will make a point of paying their dues promptly.

Notice of Change of Address

If your address changes, notify the Club immediately. Send your complete new address to the Treasurer, Leonard C. Brecher, 1900 Spring Drive, Louisville 5, Kentucky. He in turn will notify the publisher and editor.

Members are reminded of the Club's urgent need of spare issues of Numbers 1, 2, and 3 of the 1951 volume of the *Bulletin*. For further details, see Editorial section of this issue.